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ECONOMIC STUDIES

OF

MARYLAND

PART IV

by

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ECONOMIC STUDIES OF MARYLAND

PART IV

INTRODUCTORY STATEMENT

The Commission has previously released two publications in the series of Economic Studies of Maryland. The first publication related to Parts I and II of the studies and presented an outline of the Survey and a Base Pattern of Maryland's economy as of 1930. The second publication, related to Part III, and presented statistical data indicative of Industrial changes and the effect of these changes on the State's economic pattern. Some interpretations of these data were also presented to demonstrate their use. The data refer to the sixty year period prior to and the seven year period subsequent to 1930.

This, the third publication, relates to Part IV. It is diagnostic in character and is devoted partly to interpretation and correlation of statistical data presented in Part III and partly to presentation of non-statistical material and description of methods used in the diagnosis.

Out study of the sixty year period prior to 1930, the year of our Base Pattern, begins with the decade immediately following the Civil War decade. It marked the beginning of a period in which Maryland's economy underwent considerable readjustment.

At the beginning of the Civil War, Industry was predominant in Maryland's economy and the Service Industries were predominant in her industrial pattern. Her Service Industries were centered in the trade services. During the war and the reconstruction period following it, Maryland lost most of her southern trade and never fully regained it.

This necessitated readjustments in the State's industrial economy, which later were accomplished through expansion of the Non-Service Industries and particularly of manufacturing.

This Industrial Transition not only caused a great increase in the relative occupational importance of the Non-Service Industries, but also contributed to sustaining the importance of the Service Industries.

The Service Industries continued predominant in relative occupational importance, in the State's economic pattern, throughout the 1870-1930 period. The character of the services, however, underwent a radical change in which the Intra-Sectional Services increased greatly and the Extra-Sectional Services declined considerably in relative occupational importance. The principle influences contributing to this change were a large decline in trade services and a large expansion in the State's manufacturing industries with a coincident expansion of local transportation, power and other services requisite to servicing local industries.

The effects of the Civil War on Maryland's Industrial Stability have been indicated by the following interpretations of the statistical data:

1. During the Civil War decade and the decade following it, Maryland Industry collectively showed a marked loss of stability. The State suffered a material loss of importance in Inter-State Commerce.

2. In the two succeding decades the State neither gained nor lost Industrial Importance in the nation; apparently she stabilized at the level to which she dropped in the two preceding decades.

3. In the first decade of the 1900-1937 period Maryland showed a marked gain in Industrial Stability and has since consistently maintained this gain.

An examination of the wide difference in Industrial Stability in these periods discloses that the gains following 1900 more than com-

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pensated for the losses in the first period with the net result that Maryland's Industrial importance in the nation is now materially greater than it was in the period immediately preceding the Civil War.

Interpretation and correlation of occupational and population statistics discloses that Industrial expansion and particularly expansion in Manufacturing has been the predominant influence in the State's population increase and in distribution of this increase. It resulted in the following characteristics:

1. A stabilization in the decadal rate of population increase in Maryland following 1880 while the national rate almost continuously declined.
2. A high concentration of population increase in the State's six Industrial Sections and particularly in the Baltimore Industrial Area. The magnitude of the concentration has been shown in the interpretation of population statistics in Parts III and IV.

The great influence of the Port of Baltimore on the State's Industrial development has been indicated by the concentration of Manufacturing adjacent to the Port.

Maryland's Manufacturing Industries collectively showed better employment stability than the nation's in the 1921-1937 period. Maryland's employment varied within narrower limits in the 1921-1929 period, receded less in the 1929-1937 period and in the recovery phase of this period established a peak above that of 1929 while national employment failed to reach its 1929 peak.

Interpretations of employment statistics relating to Intra-State shifts in importance, Inter-State change in Importance, Employment Trends in Selected Manufacturing Industries and Departures of these trends from national trends have been presented in Parts III and IV. It is impossible in this brief foreword to comment on these other than to say that collective-

ly they give evidence that good diversity in the State's manufactures has contributed to the compensation of employment losses in some industries by gains in others resulting in collectively increased employment in the State's manufacturing industries.

When the various interpretations, presented in Parts III and IV, are considered jointly they lead to the gratifying conclusion that Maryland has demonstrated ability to meet crises in her Industrial Development with the necessary readjustments and to follow these with rises in her economic level. This is a noteworthy accomplishment.

The materials thus far considered indicate that future advancement will depend principally on further expansion of Manufacturing. Recent developments at the Bethlehem Steel and Martin Aircraft plants, the new Bata Shoe Factory and other manufacturing operations, indicate that Manufacturing Expansion is continuing.

Abel Wolman

Chairman
Maryland State Planning Commission.

ECONOMIC STUDIES OF MARYLAND

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CHAPTER 1

INTRODUCTION

It would seem fitting to begin Part IV with a reiteration of its purposes and objectives. It is diagnostic, in that it is directed toward the determination of the effects resulting from observed changes, and to the determination of causes contributing to them.

An initial step in the process of diagnosis is the interpretation of the changes indicated by the various statistical series of Part III. In part these interpretations will indicate effects and in part they will indicate causes. In the former case the object of the interpretations is to express the indicated changes of population, occupations, employment, wages, etc., in terms of their effect on the economic stability of the State or the "economic parts" of the State -- its "Economic Sections". In the latter case the object of the interpretations is to indicate the predominant causes or influences responsible for the indicated change.

In Part III we devoted considerable space to emphasizing the fact that an observed change in any statistical series was accepted only as an indication of change and not as evidence of change until validated by methods to be described in Part IV. It follows therefore that interpretations of such statistical series must be regarded as indications of effects or causes until the statistical changes have been validated.

The interpretations of the various statistical series developed in Part III are discussed in Chapters 2 to 4 of Part IV. Chapter 9 of Part IV will treat of the methods of validating the indicated changes.

CHAPTER 2

POPULATION AND OCCUPATIONAL CHANGES, INTRA-STATE INDUSTRY SHIFTS 1870 - 1930

As we examine the various statistical "indications" of change developed in Part III, we can, and do, begin to "interpret" these indicated changes. Such interpretations are in effect tentative conclusions. They are only tentative, indicating in some cases the causes, and in other cases the effects of various observed changes. It is a relatively simple matter, with the material before us relating to the changing industrial pattern of the Predominant Industries and the Industrial Sections of the State, to select, and concern ourselves only with such tentative "conclusions" as will, if later confirmed, occasion a change of predominant significance to some section or sections of the State. Thus, they give direction to a continuous diagnostic study confined to influences of important sectional significance.

We can best illustrate this by presenting in summary form some of the statistical observations of change derived from Part II and III, and pointing out certain relevant "interpretations".

Population:

In the sixty year period (1870-1930) Maryland's population doubled, while that of the nation trebled. During the forty year period (1890-1930) Maryland's population increased from 1,042,390 to 1,631,526 an increase of 56.3%. In this same period, the national population rose from 62,947,714, to 122,775,047, an increase of 95.2%. But coincidentally, with this State increase in population, the six Industrial Sections of Maryland rose from 632,700 to 1,173,300, an increase of 540,600 (85.5%). This increase in the Industrial Sections amounted to 92% of the total popu-

lation increase of the State. The percentage increase in population of the Industrial Sections was 85.5% as contrasted with the State's increase of 56.3%. The significance of this is evident. Maryland's increase in population was concentrated in the six Industrial Sections of the State. And now, one more significant "interpretation" of Maryland's population increase ; as the State population increased 589,136 and the population of the Industrial Sections increased 92% of this amount or 540,600, the population in the area of Baltimore City, Baltimore, Anne Arundel and Prince George's counties increased 477,179; or in other words, 88% of the population increase in the Industrial Sections of the State occurred in the Urban section of Baltimore and the two Rural Industrial Sections I-2 and I-3.

Occupational Change:

Reverting now to the sixty year period (1870-1930) prior to the date of our "Base Pattern", let us summarize some of the occupational changes in the State and in the nation:

	Percent of Population Gainfully Occupied		Percent of Gainfully Occupied			
			In Industry		In Agriculture	
	1870	1930	1870	1930	1870	1930
United States	33.5	39.8	47.0	78.6	53.0	21.4
Maryland	33.1	41.2	68.9	84.2	31.1	12.5

The important changes in the Predominant Industrial characteristics of Maryland in the entire period become evident.

Now summarizing the occupational change in industry for the same period:

	Percent of Gainfully Occupied					
	In Industry		In Non-Service Industries		In Service Industries	
	1870	1930	1870	1930	1870	1930
United States	47.0	78.6	22.4	31.4	24.6	47.2
Maryland	68.9	84.2	24.5	34.9	44.4	49.2

This tabulation indicates the increasing importance of the Non-Service or Productive Industries in Maryland, or in other words, it indicates that the Industrial growth of the State has been largely confined to this latter group - the Productive Industries.

In Part II we discussed at some length a subdivision of the Service Industries which we are using in our analysis. This divides the Services into two groups:

1. The Intra-Sectional Services--those servicing ultimate consumers of the sections in which they are located.
2. The Extra-Sectional Services--those servicing local Industries, those servicing Industries lying in sections other than those in which they are located, or servicing other sections than the ones in which they are located.

As the importance of occupations in the services grew in the nation from 24.6% to 47.2%, other statistical studies indicated that this growth occurred in both of the service classifications just mentioned. We developed in Part II that in 1930, approximately 33-1/3% of the gainfully occupied of any community were in the Intra-Sectional Service Group. Obviously, since the importance of the National Services in 1870 was only 24.6%, this Intra-Sectional group grew from some figure less than 24.6% in 1870 to 33-1/3% in 1930. There seem to be adequate indications that Maryland's Intra-Sectional Services also grew in importance during this same period. But as the tabula-

tion shows, the importance of the total services of Maryland increased little, changing only from 44.4% in 1870 to 49.3% in 1930. Consequently, with the importance of the total services remaining relatively constant, and with the Intra-Sectional Service importance increasing, the importance of Maryland's Extra-Sectional Services must have declined. It may be said incidentally that there seems to be a historic explanation of the cause of this. Accepting it for the time being as an indication only, we can now set up a "tentative conclusion" relating to occupational change in Maryland from 1870-1930 as follows:

An occupational increase in importance in the Non-Service or Productive Industries.

An occupational increase in importance in the Intra-Sectional Services.

An occupational decrease in importance in the Extra-Sectional Services.

An occupational decrease in importance in Agriculture.

The following tabulation gives qualitative expression to the foregoing:

Occupational Importance - Maryland

	1870 %	1930 %
Productive Industries	24.5 (1)	34.9
Intra-Sectional Services	21.0	33.3
Extra-Sectional Services	23.4	16.0
Agriculture	31.1	12.5
Total Gainfully Occupied	100.0	96.7 (2)

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(1) This value is approximate. If it is in error the correct value would be less than that shown.

(2) The 1930 Census lists 3.3% of the total gainfully occupied under the heading "Industry Unspecified".

Intra-State Industry Shifts:

Under this caption, two kinds of Industry Shifts" are considered:

1. Shifts or changes in "importance" of the Industries of the State.
2. Shifts in geographic location of the Industries of the State.

In the first case, the shifts or changes in "importance" of Maryland's Industries are highly dynamic in character; they are forever changing. This is indicated in Exhibit 9, page 25 of Part III. But in the second case, which relates to the geographic change in Maryland's Industries, a very different condition has prevailed. Earlier in this chapter, under the caption of "Population Changes" it has been shown that the population increase of the State has been concentrated in the six Industrial Sections of the State as defined in the Base Pattern of Maryland (Part II). This alone indicates that the Industrial expansion of the State was largely confined within these Section boundaries and as the various "Industry Studies", develop the plant locations of Maryland's Predominant Industries, there is a very definite confirmation of this phenomenon.

We can now state definitely that, with minor exceptions, Maryland's Industrial growth for at least a period of forty years prior to the date of the Base Pattern (1890-1930) has been confined to the boundaries of the six Industrial Sections established in the Base Pattern of 1930. Essentially the entire Industrial growth of the State has been confined to the five counties and three cities comprising the six Industrial Sections. That is to say, there has been, in the period mentioned, no "geographic shift" of Industry to areas lying without the boundaries of these six sections. But as we shall see later in Chapter 3, the Industry shifts *within the boundaries of the Industrial Sections* have been of very appreciable magnitude.

CHAPTER 3

POPULATION AND OCCUPATIONAL RATES OF CHANGE IN THE UNITED STATES, MARYLAND AND THE INDUSTRIAL SECTIONS OF MARYLAND - INTERPRETATIONS, CAUSES AND ECONOMIC IMPLICATIONS OF THESE CHANGES 1870 - 1930.

In the sixty year period preceding the date of the base pattern (1930), the population of Maryland doubled, while that of the United States trebled. The marked change in occupational characteristics of the State which occurred during the period are shown on page 5 of Chapter 2, by contrasting the importance of the several occupations in 1870 with the importance of these same occupations in 1930, the year of our Base Pattern.

In this chapter (3) is developed, for each of the six decades of the sixty year period, first; the relationship of the population growth of Maryland to that of the nation and second; the relationship of the population growth of the several Industrial Sections of the State to that of the State as a whole. The interpretations of these changing relationships will then be presented and the indicated causes of such changes will be defined.

Exhibits 3 and 4 from Part III are, for convenience reproduced as Exhibit 1, on page 22 of this part. We shall refer to the upper graphs as the "trend graphs" and the lower graphs as the "rate of change graphs".

In the first decade (1870 - 1880) the population of Maryland increased 20% while that of the nation increased 30%. In the second decade Maryland's rate of increase in population declined precipitately to an increase of about 12% while the national decline in rate was only from 30% in the first decade to 26% in the second decade.

A further study of the "rate of change" graphs indicates another

striking dissimilarity between the decadal rates of population increase in Maryland and in the United States. In Maryland, as the population increased through the *last five decades*, the rate of increase in each decade held practically constant, averaging about 12%, and varying between the narrow limits of 13.5% as a maximum and 9% as a minimum. Contrasted with this the decadal rates of the United States declined, with minor exceptions (the 1900-1910 decade and the 1920-1930 decade) continuously throughout the last five decades, falling from a population rate of increase of 26% in the second (1880-1890) decade to 16% in the sixth decade (1920-1930).

Both the abrupt change in the Maryland rate, occurring between the first and second decades, and the constancy of Maryland's rate of change throughout the last five decades have very definite economic implications which are discussed in the two paragraphs immediately following.

A change of rate of population growth in Maryland as abrupt and of the magnitude indicated, namely, from 20% in the first to 12% in the second decade, connotes a coincident change in the economy of the State, involving coincident changes in such economic factors as employment, wages and other income, production and operating costs and State revenues. This in turn necessitated material economic readjustments in the State if its economic stability was to be maintained, or its decline in economic stability minimized.

But the fact that for so long a period as fifty years, subsequent to the abrupt decline in rate of change, discussed in the preceding paragraph, and during which the population of the State as well as that of the nation was continuously increasing, the percentage rate of increase in Maryland was maintained practically constant while that of the nation was declining, indicates, in the light of other information available for the

State and nation, that economic readjustments *were* made which resulted in an *improvement* in the economic stability of the State. Knowing that throughout this fifty year period the population of the country, its wage scales, employment and income were all increasing it would be difficult to explain why, throughout *so* long a time period, the growth of population in Maryland continued to be more stable than that of the nation unless its economy was consistently maintained on a more stable basis than that of the nation. We shall see in the ensuing chapters, as we discuss the other statistical series of Part III, whether the interpretations of these other series tend to confirm or contradict this interpretation.

Now in the last four decades (1890-1930) of the 60 year period we have been discussing, we have shown that the population of Maryland increased from 1,042,390 to 1,631,526, an increase of 589,136. In the same period the population increase of the six Industrial Sections (the three cities and the three Rural Industrial Sections I-2, I-3 and H-5) was 541,144 or in other words the population increase of the six Industrial Sections of the State represented about 92% of the total population increase of the State.

In the same way we have related the population trends and decadal rates of change in population of Maryland to those of the United States, we can also relate these trends and rates of change of the *Several Industrial Sections* of Maryland to those of the State as a whole.

In this case we shall confine our considerations to the last four decades (1890-1930) of the sixty year period previously considered. To avoid complications due to change in City boundaries we have consolidated certain Industrial Sections into Industrial Areas which may be defined as follows:

Industrial Area of Baltimore

Includes the Urban Sections, (Baltimore) and the Rural Industrial Section I-2 (Baltimore County).

Industrial Area I-3

Includes the Rural Industrial Section I-3 (Anne Arundel and Prince George's Counties).

Western Maryland Area

Includes the Urban Section, (Cumberland) and the Rural Industrial Section H-5 (Garrett and Allegany Counties).

The characteristics of population "trends" and "rates of change" in each of these industrial areas related to those of the State are shown in Exhibits 2, 3 and 4 on pages 23, 24 and 25 of this part. We comment below on the characteristics of these three industrial areas:

Industrial Area of Baltimore

Because of the large concentration of the State's population in this area, its "rate of change" characteristics are generally very similar to those of the State. For the 40 year period the area's population has increased 83% as compared with the State increase of 56%.

For the first three decades the "rate of increase" of the area was constantly slightly greater than that of the State. In the fourth decade the "rate of increase" fell slightly below that of the State.

The same, or very nearly the same constancy of "rate of increase" that applies to the State applies to this area and therefore, the same interpretations relating to the economic stability of the area may be said to apply.

Industrial Area I-3

In the first and second decades the "trend" and "rate of change" characteristics closely conform to those of the State as a whole. In the third decade the "rate of increase" of the area (18%) is materially above that of the State (14%) and that of the nation (15%) see Exhibit 3.

In the fourth decade the "rate of increase" of the area is extremely high (26%) as compared to that of the State (12%) or the nation (16%). The abrupt and material change in rate of population increase occurring between the second and third decades connotes an abrupt and material change in the economy of the area.

Western Maryland Area

In the first decade the area's "rate of increase" (28%) was greatly above that of the State (14%) or of the nation (21%). The area's decline in "rate of increase" to 7% in the second decade was precipitate compared to the State's decline from 14% to 9.0% and the nation's rate holding constant at 21%. (It may be stated in passing that Maryland's decline in the second decade was in large measure attributable to the Baltimore fire of 1904.)

The third decade shows no change in rate of increase but the fourth decade shows an increase from the 7% of the third to 13% for the fourth decade. In this last decade Maryland's "rate of increase" was 11% and the national 16%.

The implications of marked and continuous economic fluctuations in this area coincident to the extreme and continuous changes in the rates of population growth are evident.

We should like at this point to say that the wide variance of the characteristics of population growth between the Sections and between

each Section and the State as a whole as well as the continuing change of these characteristics clearly shows the futility of an analysis of the economy of a state without a "sectional knowledge" of the state and a continuing knowledge of the changes in the sections as well as in the state. In fact there can be no continuing knowledge of the State without a continuing knowledge of the Sections.

We may turn now to a consideration of the more predominant causes responsible for the widely variant characteristics of population growth in Maryland and in the Industrial Sections of the State. If we consider first the characteristics of population growth of the State as a whole, as indicated by Exhibit 1 page 22, we will recall the two interpretations of these data developed earlier in this chapter. The first of these interpreted the sharp decline in the rate of Maryland's population growth occurring between the first and second decades of the 60 year period considered, as indicative of a coincidental economic change in the State. The second was to interpret the constancy of Maryland's rate of change in population over a long period (50 years) subsequent to the observed decline in rate as indicating that the economic adjustments incidental to the observed change in rate had been of such character as to result in the maintenance of a relatively high plane of economic stability throughout the fifty year period.

Since the outbreak of the Civil War there have been two historic occurrances which have had a profound influence on the political economy of Maryland. They are the Civil War itself and the Baltimore fire of 1904. While we have attempted no detailed study of the effects of the Civil War on the economy of Maryland, we have considered sufficient material, largely historic, but partly statistical, to convince us not only that its influence was profound but also that the resultant economic reactions on Maryland

were so enduring as to occasion a financial and industrial depression in the State of far greater severity than any subsequent ones.

At the outbreak of the war Maryland was definitely an industrial state.(1) But her industrial occupations were largely in what we have called the Extra-Sectional Services. These included wholesale trade, finance and transportation, and most of the latter was water borne. Her markets for these services in pre-war days had been partly foreign, but largely domestic and confined largely to the southern states. Throughout the war (1861-1865) the southern markets were closed by the Union's most effective blockade. Through the reconstruction period the purchasing power of the South was definitely limited by her distressed financial position. Thus for the decade preceding the sixty year period we have been considering Baltimore's and therefore Maryland's trade with the South was at a standstill. But after the recovery in the South assumed substantial proportions Maryland fell far short of recovering completely her Southern markets, for as this recovery of the South progressed, first by the resumption of her agricultural pursuits and later by her industrial development, she in a large measure developed her own services in the Extra-Sectional group--in trade, finance and transportation.

A very dramatic presentation of the effects of the Civil War on the political economy of the "border state" of Maryland constitutes the subject matter of chapters 5 and 6 in "The Sun Papers of Baltimore."(2) They indicate(3)

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(1) We have seen at the end of the last chapter, that in 1870, 69% of the gainfully occupied of the State were engaged in industrial occupations. In the same year only 47% of the gainfully occupied of the nation were engaged in industrial pursuits. Much the same conditions prevailed in 1860.

(2) By Gerald W. Johnson, Frank R. Kent, H. L. Menken and Hamilton Owens, Alfred A. Knopf, Publ. 1937.

(3) Page 131.

the depressed condition of Baltimore to have endured throughout "the fifteen years immediately following the Civil War" which would bring us to 1880, the end of the first decade of our sixty year period.

It is at least of interest to note that this date coincides with the date of the break in our Population Rate of Change graph for Maryland shown in Exhibit 1 page 22, which indicates the relatively unstable growth of Maryland's population prior to, and the relatively stable growth subsequent to 1880.

If we accept our second premise namely, that the stabilization of population growth is indicative of economic stabilization, we would fix the length of Maryland's Civil War Depression at 20 years and would have fully justified the name we have applied to it and in doing so have defined its cause.

At this point we refer to another series(1) of "trend" and "rate of change" graphs relating to:-

Gainfully Occupied
Occupied in Industry
Occupied in Agriculture
Occupied in Non-Service Industry
Occupied in Service Industry

for Maryland and for the United States in the 60 year period (1870-1930).

An examination of these graphs will show how Maryland's gainfully occupied "lost position" from the first to the second decade and how each of her occupational classifications showed a "loss of position" with the single exception of the Non-Service group which showed a "gain of position" in the second decade. In this group Maryland's rate of increase was greater in the second decade than in the first while the nation's rate of increase was less than in the first decade.

An examination of the third decade tells a very different story. The percent of the population gainfully occupied in the State and all of

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(1) Exhibits 5 to 9, pp. 26 to 30 inclusive.

the occupational classifications with one exception (this time too the exception is the Non-Services Group) show material gains in position.

It will be interesting to see now if our various "rates of change" characteristics in the 1900-1910 decade in any way seem to conform to our historic knowledge of the Baltimore fire of 1904.

This fire occurred in February 1904. It started on a Sunday morning in what was then known as the wholesale district, completely devastated an area which can be roughly defined as bounded on the west by Sharp Street, the north by Fayette Street, the south by Pratt Street, and the east by Jones Falls. As the writer recalls it the only buildings not destroyed in this area were the Safe Deposit and Trust Company building on South Street, the new power house of the United Railways on Marsh Market Slip (their old Pratt Street power house at the foot of Marsh Market was completely destroyed) and a new substation of the United Electric Light and Power Company, located as the writer recalls it in the block bounded by Charles, Fayette, Hanover and Baltimore Streets.

Roughly stated this fire covered the entire financial district, the greater part of the wholesale trade district and a large part of the retail trade district. The residential and manufacturing areas were not affected. The reconstruction of the burned area was immediately undertaken and promptly carried to completion.

Now at that time the Services, largely trade and finance were definitely preponderant. A reference to Exhibit 8, page 20, Part III, shows that in 1900 the importance of Maryland's services had reached an all time high of 50.3% (with only 28.9% importance for the Non-Service group) and these were the industries most directly affected by the fire. Because of these facts one would have expected an unfavorable reaction on the collec-

tive economy of the State and a conseouent reaction on its rate of population growth. This would seem to have happened as indicated by Maryland's decline in "rate of change" in population during the 1900-1910 decade. We have previously referred to the "constancy" of Maryland's rate of growth in population from 1880-1930, stating that it averaged about 12% for the period, varying between the narrow limits of 13% as a maximum and 9% as a minimum. We now see that this minimum occurred in what we might term the Baltimore Fire Decade. We also see that this was the only decade of the fifty year period in which Maryland's rate of population growth "lost position" when compared to the national rate of growth (See Exhibit 1 page 22).

When we refer to the rate of change graphs for the gainfully occupied (Exhibit 5, page 26), we see that Maryland "lost position" in this decade. The rate of change graph for the Service Industries shows, as we would expect, a marked loss of position. On the contrary, the non-service industries of the State, again as we would expect, showed a marked gain in position (Exhibit 8, page 29). The trend curve of this exhibit shows that occupations in this group increased 40% in the decade.

Now we are not advocating fires as economic penaceas, but we can not refrain from calling attention here to the fact that this decade marked the beginning of a thirty year period (1900-1930) in which Maryland's Non-Service Industries continued uninterruptedly to gain importance in the national pattern. We have already indicated in Part III that the gain continued beyond the date of the base pattern (1930) and through the 1929-1937 cycle. The rate of change graph for the Non-Service Industries clearly indicates this condition from 1900-1930 and Exhibit 12, page 40, Part III shows its continuance to 1937.

The "trends" and "rates of change" graphs for agriculture are extremely singular for the "fire decade" of 1900-1910 (Exhibit 7 page 28). Note the large gain of agricultural occupations (14%) as compared to a national gain of about 5% and the resultant gain in position of Maryland's agricultural occupations.

Obviously a causal determination of a change of this magnitude will be in order but belongs under our Agricultural Studies. The query however, naturally arises at this time if this growth in agricultural occupations in the 1900-1910 decade, might not possibly, in large part, have been due to a migration from Baltimore to the farms as a result of the Baltimore fire. On the whole, the trends and rates of change characteristics of population, gainfully occupied and the various occupational classifications for the State would seem to conform well with what one might be led to expect from a historic study of the fire.

We may close this chapter with a summary of its interpretations and of the indications it provides of the predominant causes for "changes" of pronounced economic significance to the State and to the Industrial Sections of the State.

The State (Period 1870-1930)

1. The sharp decline in Maryland's rate of population growth from the first decade (1870-1880) to the second decade (1880-1890) as compared to the small decline in population growth of the nation in the same period, in the light of known conditions prevailing regarding trends of employment, wages, other income, etc., indicated:-
    a. A coincident change in the State's economic pattern, involving changes in such economic factors as employment,

wages, other income, state revenues, etc.

b. A loss of economic status of the State in the national economic pattern.

2. The constancy of rate of population growth in Maryland for the fire decades (1880-1930) as compared to the declining rate of national population growth in the same period indicated that the economic adjustments incident to the change in the State's economic pattern had been such as to:-

   a. Stabilize the economy of the State, with incidental stabilization (collectively) of the economic factors of employment, wages, other income, state revenues, etc.

   b. A gain in economic status of the State in the national pattern, continuing generally through the fifty year period (1880-1930).

3. The predominant causes of Maryland's sharp decline in rate of population change in the second decade may be defined as:

   a. The large preponderance of the Service Industries with large concentration of their markets in the South.

   b. The long continued depression in these markets due, in the order named, to the Civil War, the Reconstruction Period, the preemption, in a large measure, by the South itself of these markets as the recovery of the South progressed.

4. The predominant causes of Maryland's indicated gain in economic status from 1880-1930, will be indicated, to a consid-

erable extent by the interpretations of the other statistical series of Par III. These interpretations provide the subject matter of Chapter 4 of this part. The final causal determinations became a part of the diagnostics as described in Chapters 5 to 8 of this part.

The Industrial Areas (Period 1890-1930)

1. The Baltimore Industrial Area;

Because of its magnitude the characteristics of population rates of change are very similar to those of the State. Consequently the interpretation relating to the State characteristic of improved economic stability applies also to this area. The indicated "loss of importance" of this area in the State pattern in the 1920-1930 decade is a reflection of the "gain of importance" of the two other industrial areas of the State.

2. The Industrial Area I-3 (Anne Arundel and Prince George's Counties);

The striking "gain of importance" of this area in the State's economy in the last two decades of the period, is in a large measure due to the trend to suburban residential growth in these two decades, plus the growth of employment demand in the two cities of Baltimore and Washington. On page 7 of "Five Years of State Planning," published by the Maryland State Planning Commission, December 1938, is shown a population distribution map of the counties of Maryland. Note the concentration of Anne Arundel County's population around Baltimore and Prince George's County's population around Washington. The high percentage of occupations in the Service Industries shown

in the base pattern of the Section (57%) reflects the large employment of this industrial group in Washington, D. C. (82.0% of the gainfully occupied of Washington fall under the Service Industries classification, in the base pattern of that city).

3. Western Maryland Industrial Area (Garrett and Allegany Counties and Cumberland);

   The "loss of importance", an extremely large one, occurring in the second decade, and the continued low importance in the third decade are largely attributable to the decline of coal and transportation then respectively the leading productive industry and the leading Extra-Sectional Service industry of the area. The coal decline contributed largely to the transportation decline. The "gain of position" in the last decade (1920-1930) is attributable to the growth in manufacturing industries of the area.

The Productive Industries of Maryland (1880-1930):

The "rates of change" plots of the Non-Service occupations show this occupational classification in Maryland to have "gained position" in the national pattern in each of the five decades except in the 1890-1900 decade. The most pronounced gain was in the 1900-1910 decade. This gain in inter-state position as well as the gain in intra-state importance, as indicated by its "trend" graph, point to the important part played by this group in the economic stability indicated as prevailing throughout this period.

In this chapter we have first; observed changes in the charac-

teristics of population growth in the State and in the Industrial Sections of the State, second; observed (in the case of the State) the occupational changes coincident to the observed changes in population growth characteristics, and third; indicated predominant causes contributing to such observed changes, both in the State and in the Industrial Sections.

The "causes" indicated in this chapter are general in character and in the cases of the Civil War and Baltimore Fire were suggested by a general historic knowledge of these events rather than by any extensive research. On the contrary the "causes" relating to the "changes" in the Industrial Sections were predicated on special studies forming a part of the "diagnostic" methods described in the subsequent chapters of this part.

The justification for devoting so much space in this chapter to the Civil War and Baltimore Fire is that they provided excellent illustrations of how to indicate quantitatively, in some measure at least, their resultant effects on the economic status and the economic stability of the State, as expressed in terms of changes in population growth and occupational changes.

The value of the subject matter of this chapter, as we see it, is that it provides a means of indicating population and occupational changes, which if only because of their magnitude, connote important economic changes in the communities involved. It also begins to indicate the changing intra-state importance of the various occupational groups. Finally, it begins to indicate the changing economic status of the State in the economic pattern of the nation by showing the "gain or loss" "of position" of these groups in the national pattern.

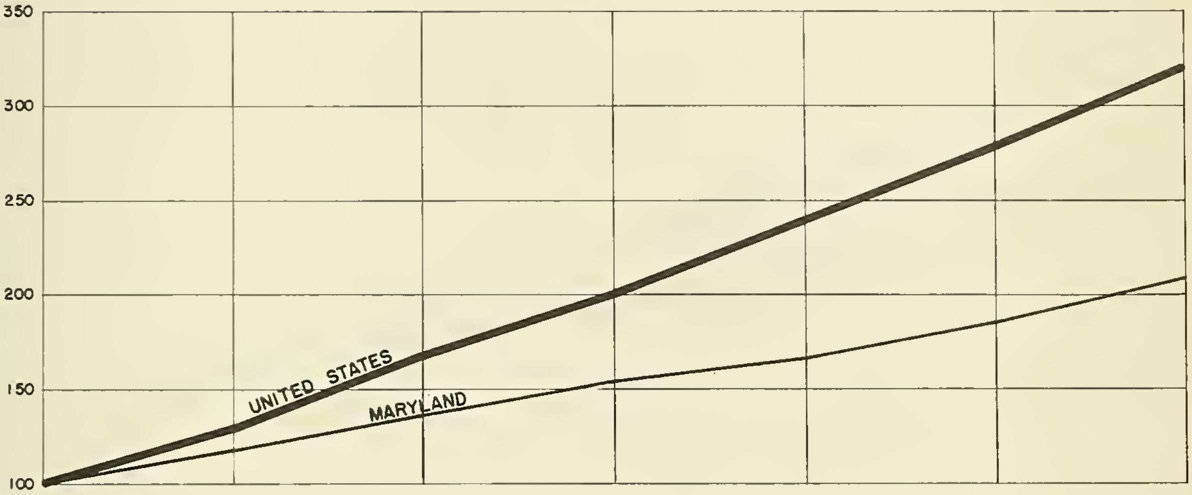
EXHIBIT – I

ECONOMIC STUDIES OF MARYLAND, PART IV

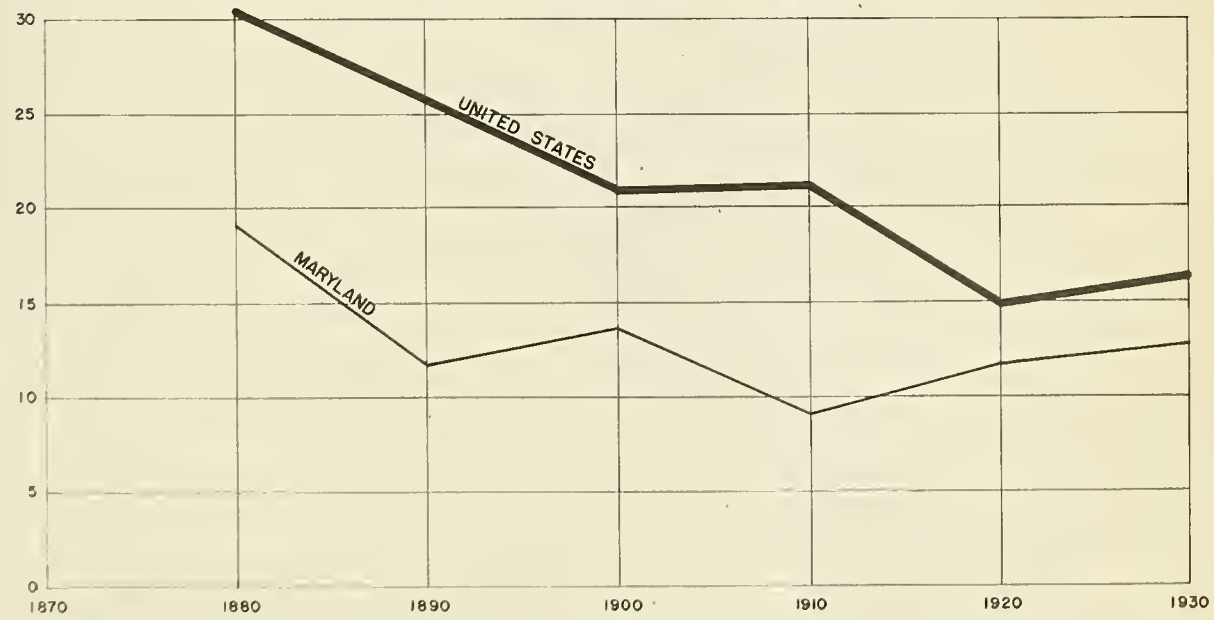
POPULATION

1870 = 100

TREND



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR EQUAL POPULATION INCREASE IN PRECEDING DECADE DIVIDED BY POPULATION AT THE BEGINNING OF SUCH DECADE.

MARYLAND STATE PLANNING COMMISSION

EXHIBIT-2

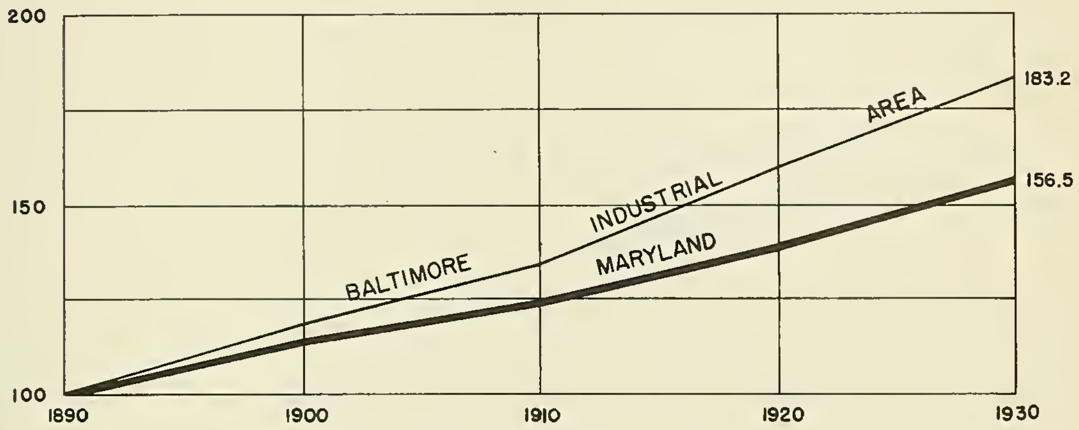
ECONOMIC STUDIES OF MARYLAND, PART IV

INDUSTRIAL AREA OF BALTIMORE (BALTIMORE & BALTIMORE COUNTY)

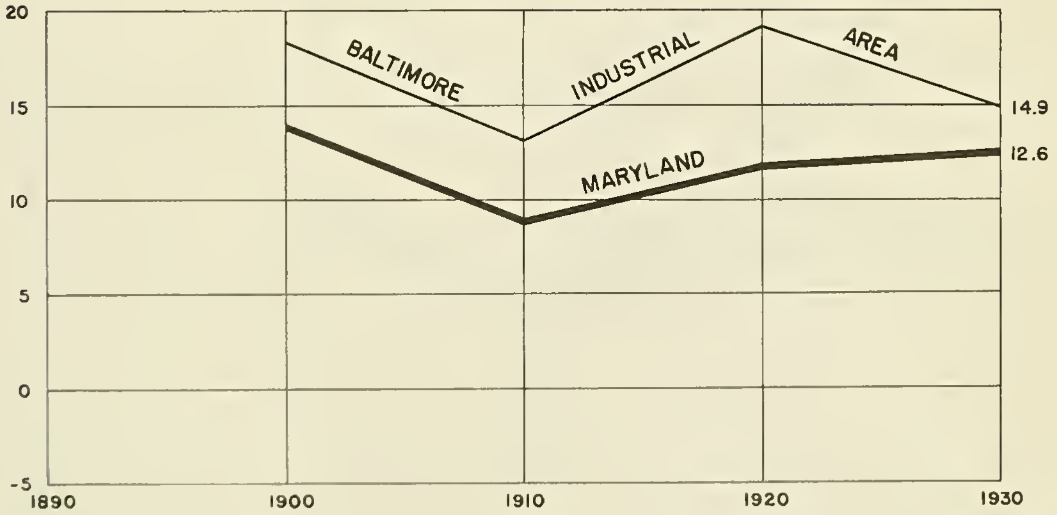
POPULATION

1890-1930

TRENDS



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR = $\frac{\text{POPULATION INCREASE IN PRECEDING DECADE}}{\text{POPULATION AT BEGINNING OF SUCH DECADE}}$

MARYLAND STATE PLANNING COMMISSION

EXHIBIT-3

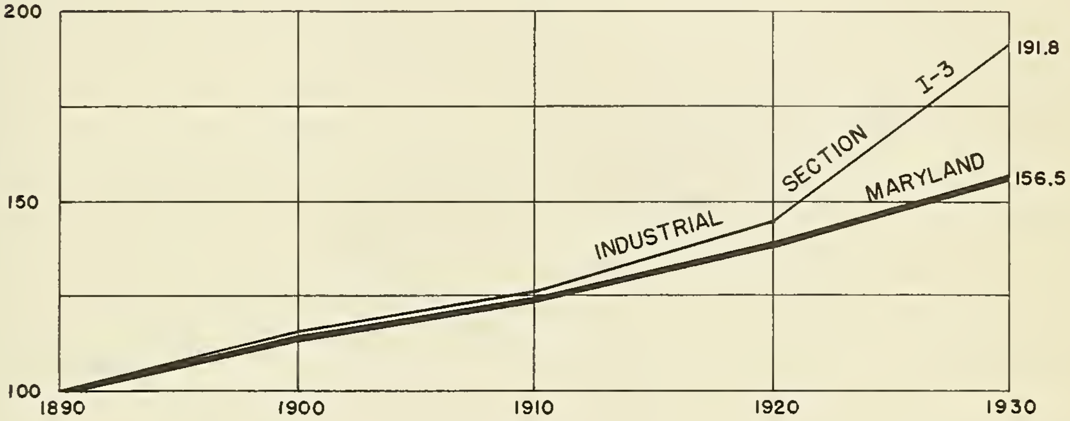
ECONOMIC STUDIES OF MARYLAND, PART IV

INDUSTRIAL SECTION I-3 (ANNE ARUNDEL & PRINCE GEORGES COUNTIES)

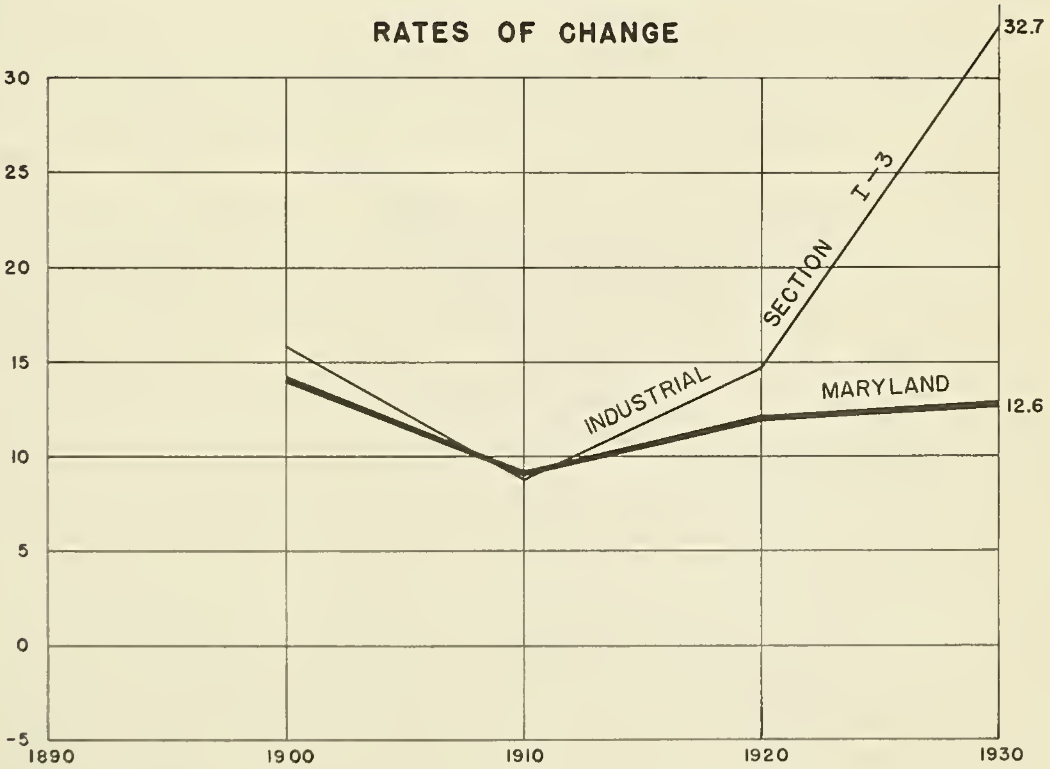
POPULATION

1890–1930

TRENDS



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR = $\frac{\text{POPULATION INCREASE IN PRECEDING DECADE}}{\text{POPULATION AT BEGINNING OF SUCH DECADE}}$

MARYLAND STATE PLANNING COMMISSION

EXHIBIT–4

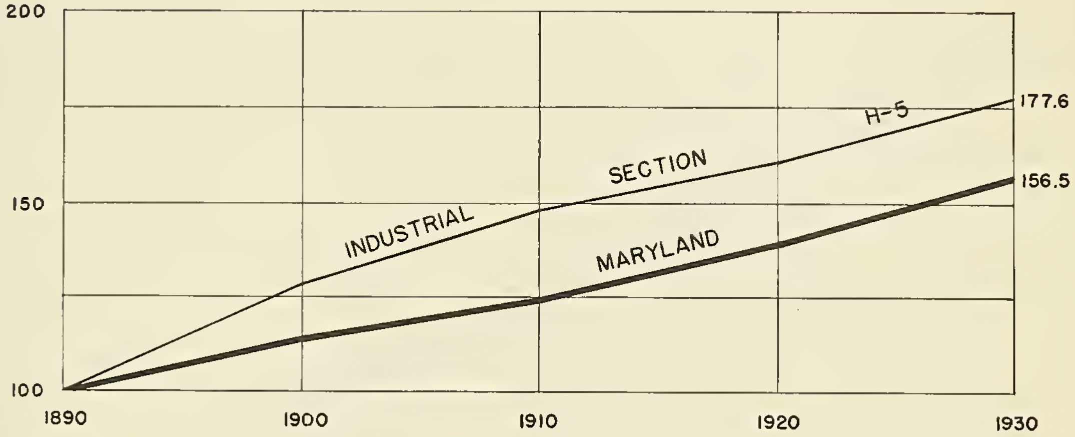
ECONOMIC STUDIES OF MARYLAND, PART IV

INDUSTRIAL SECTION H–5 (GARRETT & ALLEGANY COUNTIES) WESTERN MARYLAND AREA

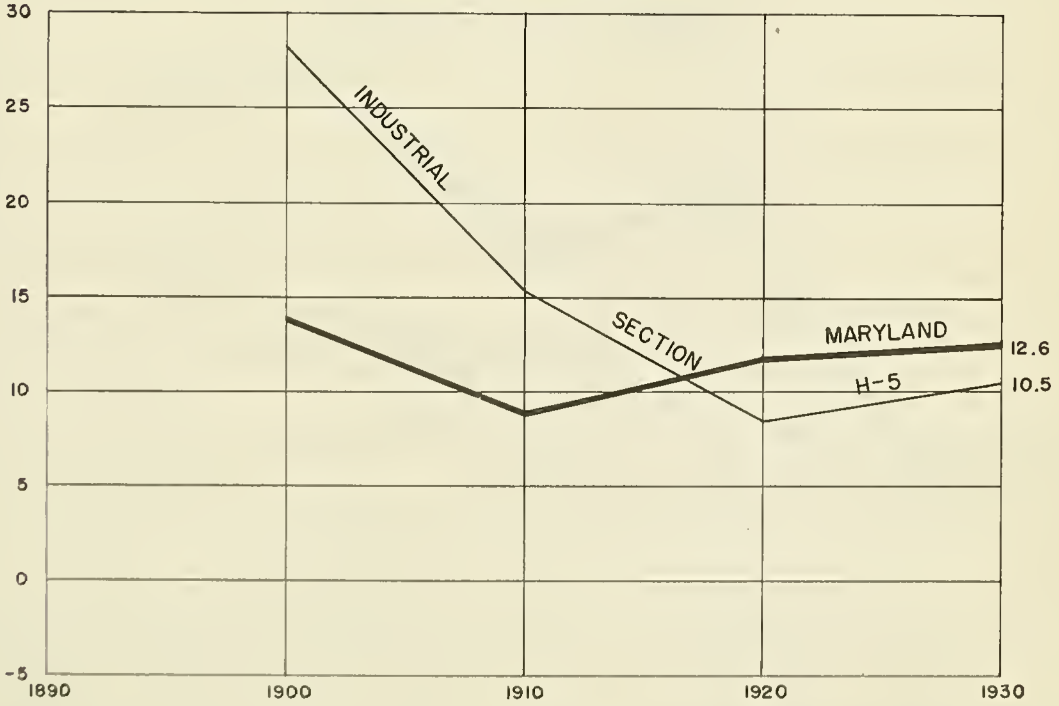
POPULATION

1890–1930

TRENDS



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR = $\frac{\text{POPULATION INCREASE IN PRECEDING DECADE}}{\text{POPULATION AT BEGINNING OF SUCH DECADE}}$

MARYLAND STATE PLANNING COMMISSION

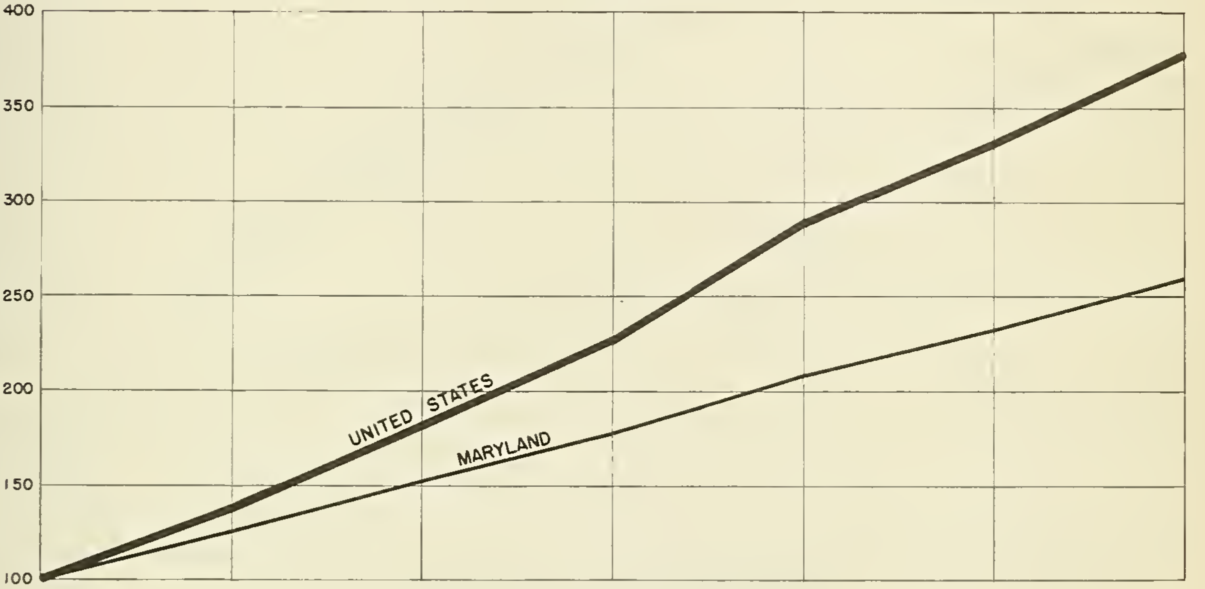
EXHIBIT-5

ECONOMIC STUDIES OF MARYLAND, PART IV

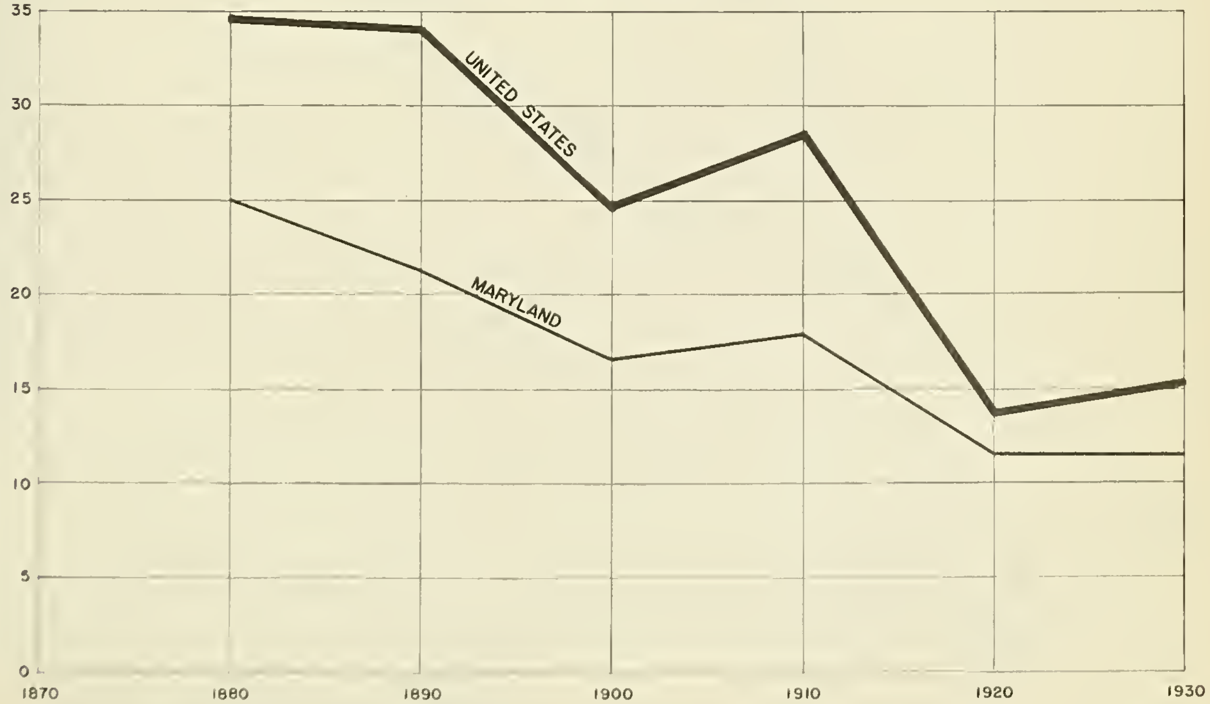
GAINFULLY OCCUPIED

1870 = 100

TREND



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR EQUAL GAINFULLY OCCUPIED INCREASE IN PRECEDING DECADE DIVIDED BY GAINFULLY OCCUPIED AT THE BEGINNING OF SUCH DECADE.

MARYLAND STATE PLANNING COMMISSION

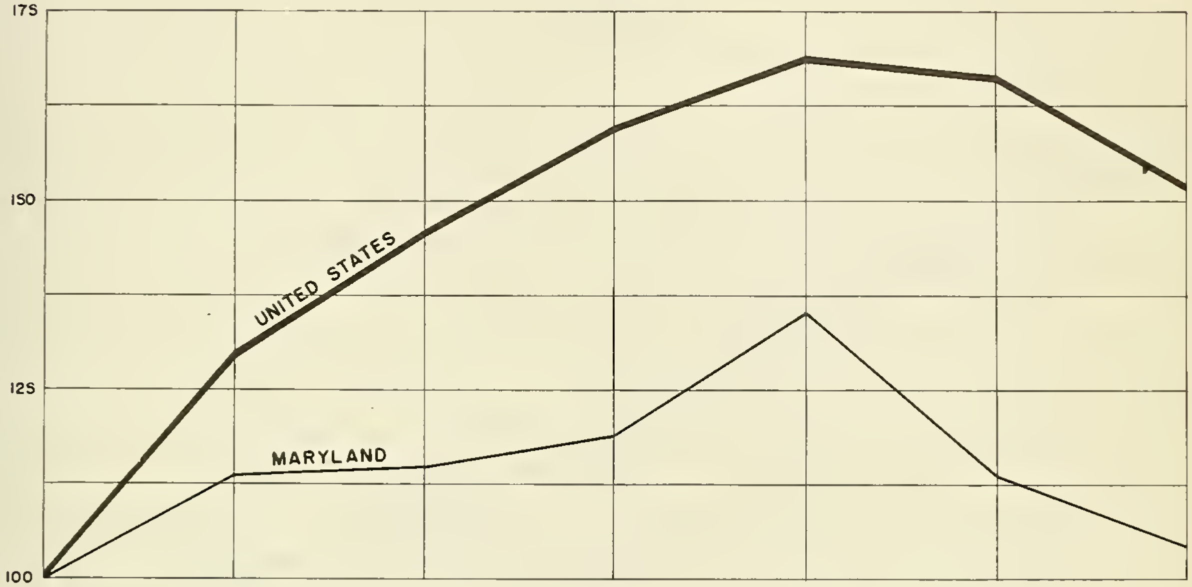
EXHIBIT-6

ECONOMIC STUDIES OF MARYLAND, PART IV

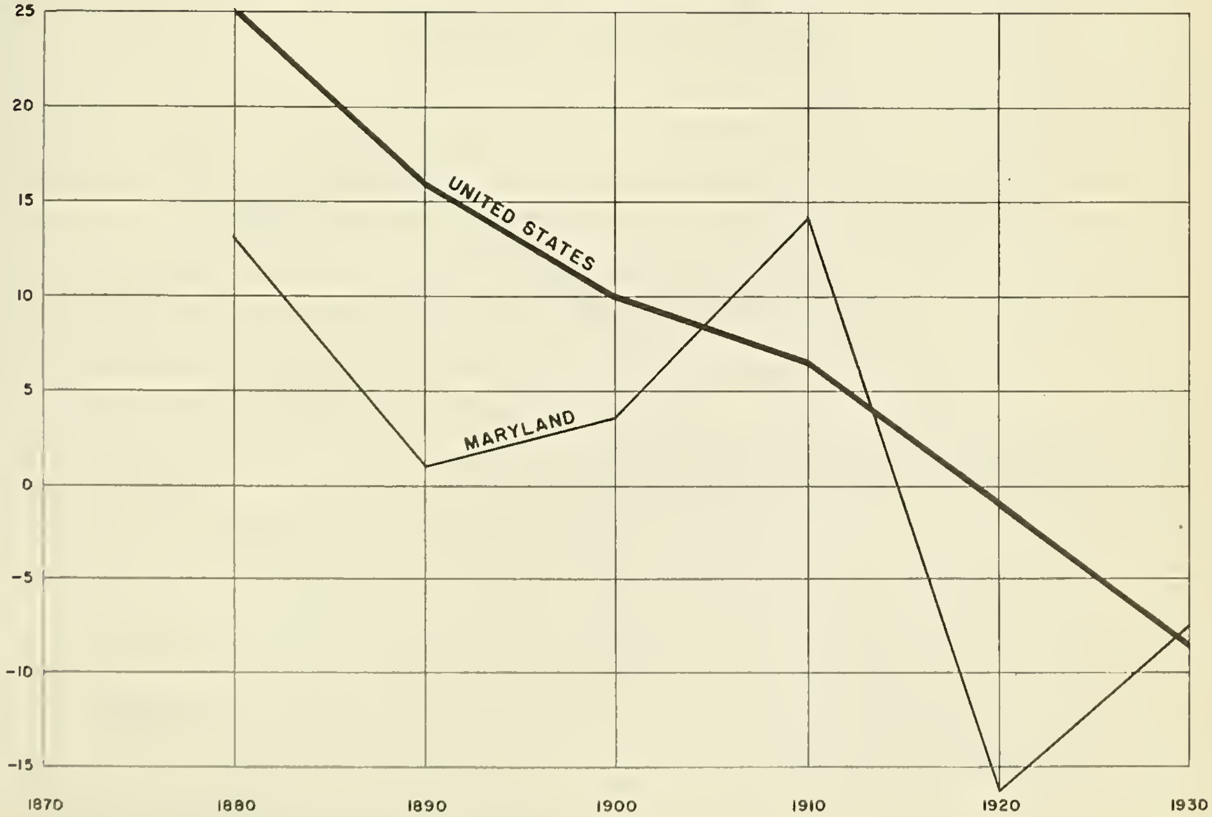
OCCUPIED IN AGRICULTURE

1870=100

TREND



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR EQUAL GAINFULLY OCCUPIED INCREASE IN PRECEDING DECADE DIVIDED BY GAINFULLY OCCUPIED AT THE BEGINNING OF SUCH DECADE.

MARYLAND STATE PLANNING COMMISSION

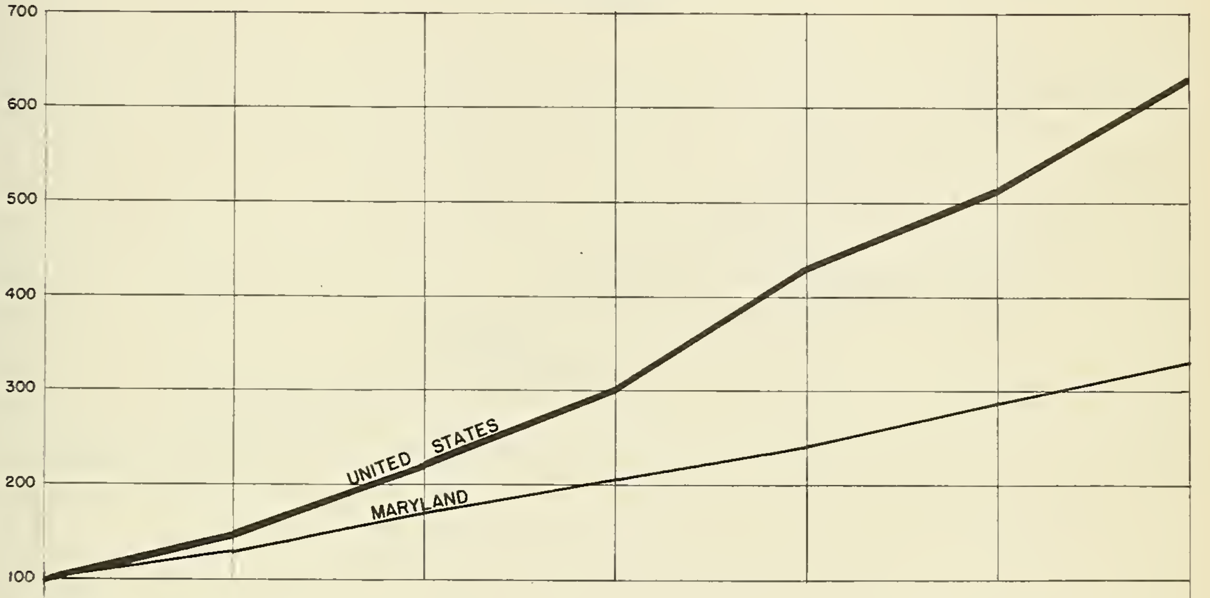
EXHIBIT – 7

ECONOMIC STUDIES OF MARYLAND, PART IV

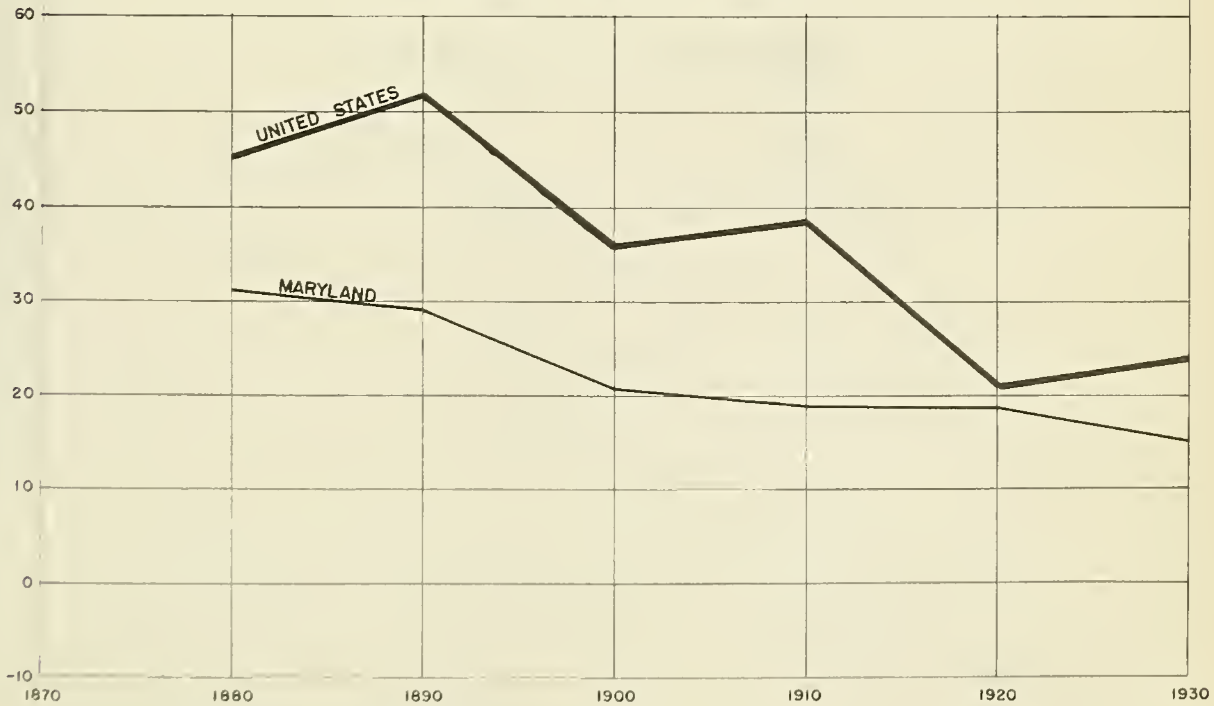
OCCUPIED IN INDUSTRY

1870 = 100

TREND



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR EQUAL
GAINFULLY OCCUPIED INCREASE IN PRECEDING DECADE DIVIDED
BY GAINFULLY OCCUPIED AT THE BEGINNING OF SUCH DECADE.

MARYLAND STATE PLANNING COMMISSION

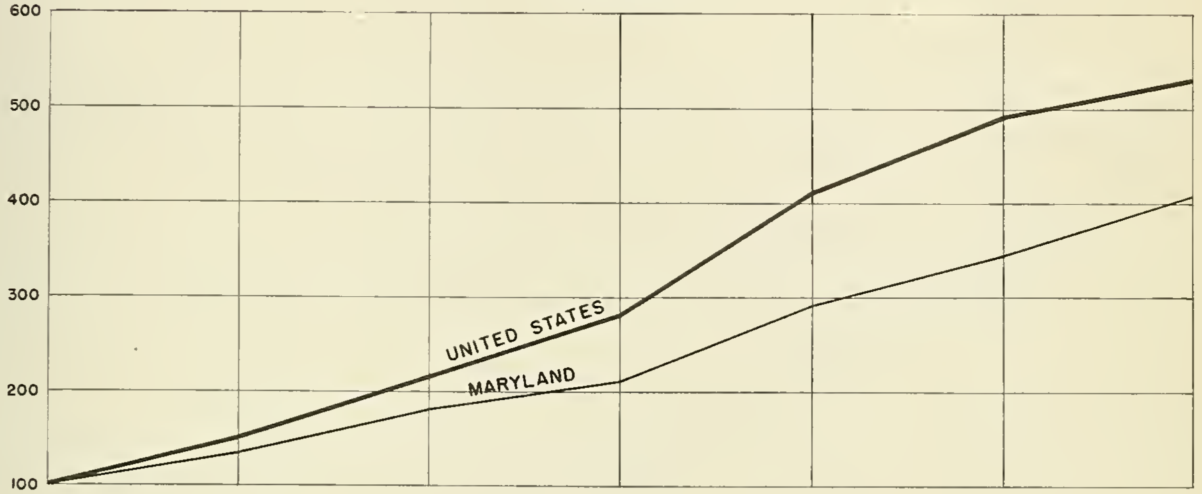
EXHIBIT-8

ECONOMIC STUDIES OF MARYLAND, PART IV

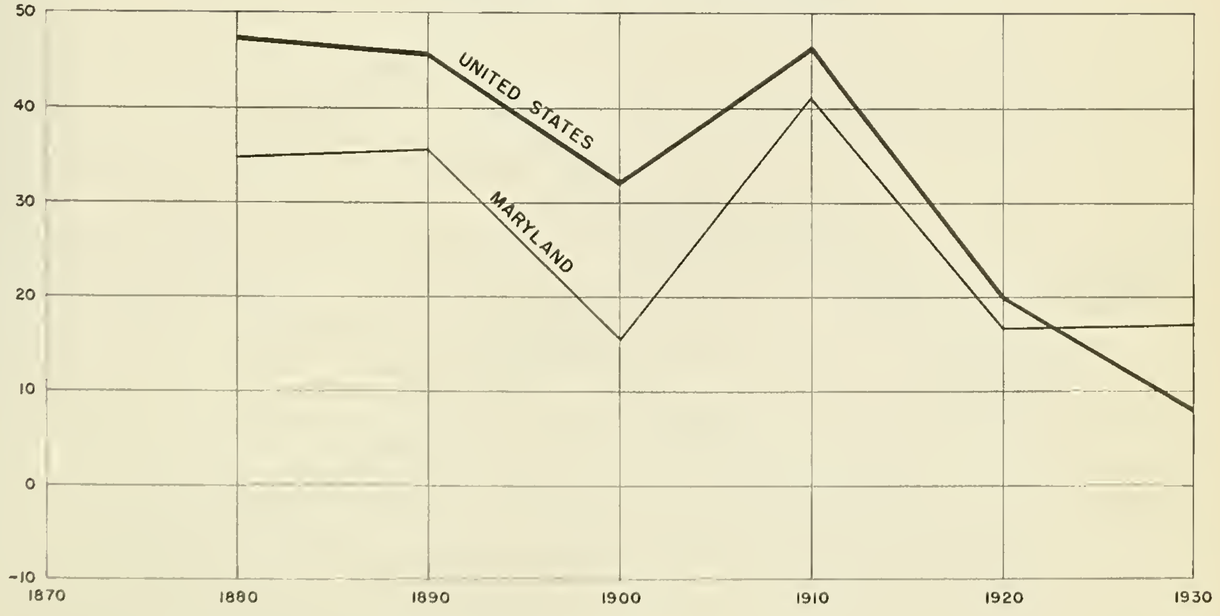
OCCUPIED IN NON-SERVICE INDUSTRY

1870=100

TREND



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR EQUAL GAINFULLY OCCUPIED INCREASE IN PRECEDING DECADE DIVIDED BY GAINFULLY OCCUPIED AT THE BEGINNING OF SUCH DECADE.

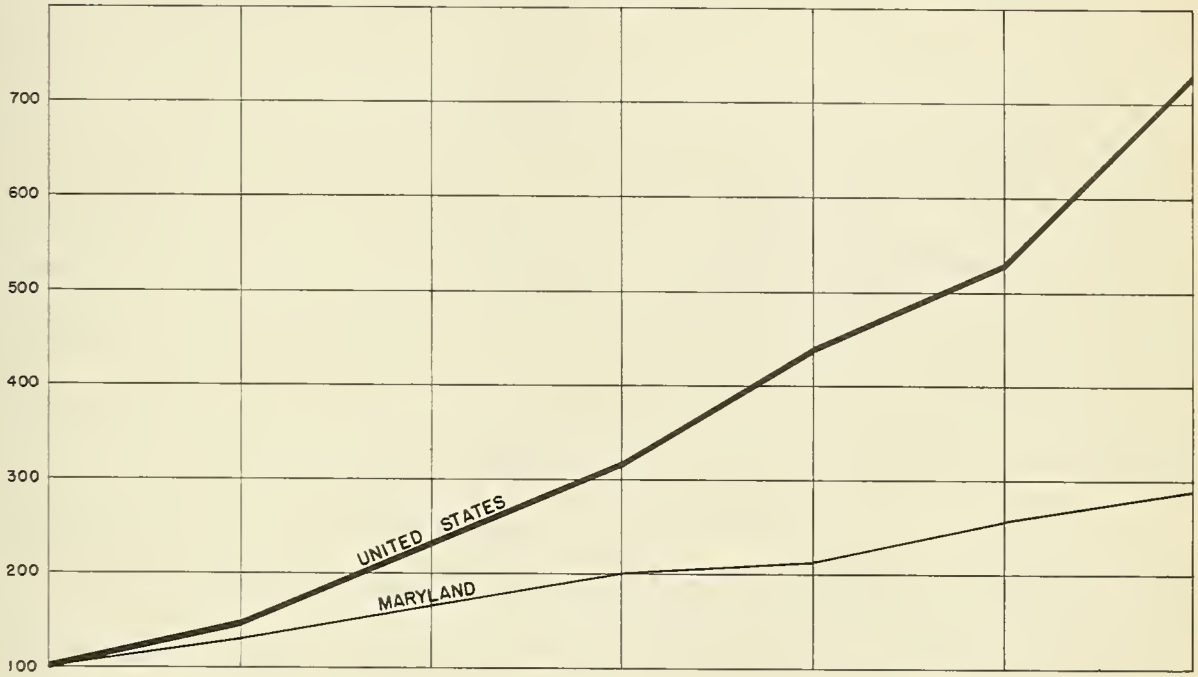
EXHIBIT – 9

ECONOMIC STUDIES OF MARYLAND, PART IV

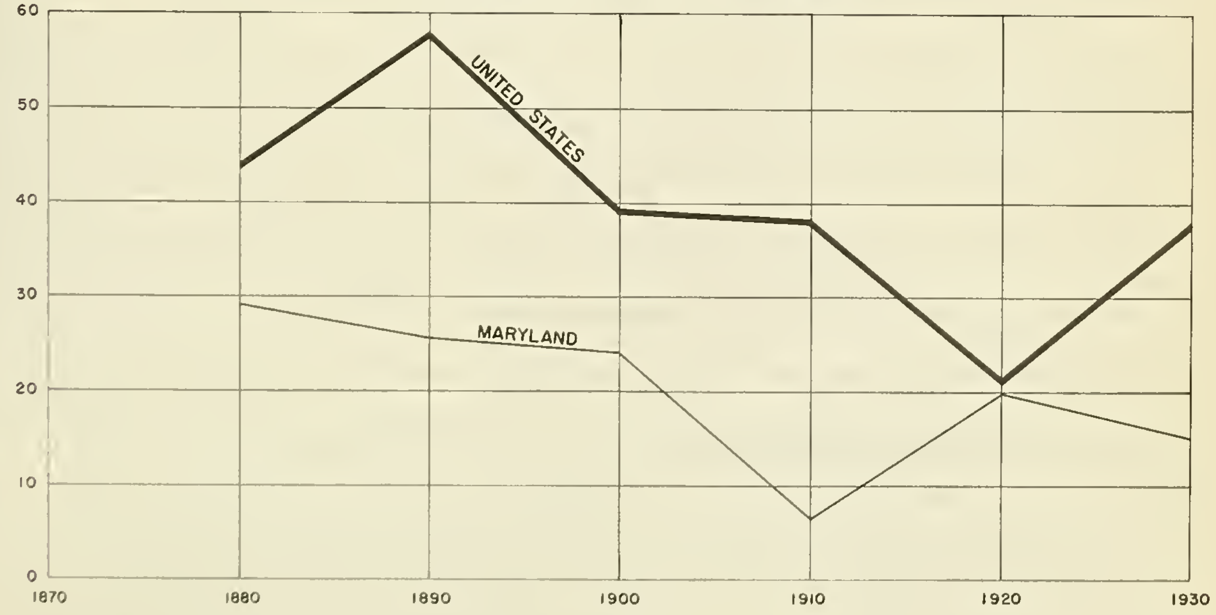
OCCUPIED IN SERVICE INDUSTRY

1870=100

TREND



RATES OF CHANGE



RATES OF CHANGE FOR EACH DESIGNATED YEAR EQUAL GAINFULLY OCCUPIED INCREASE IN PRECEDING DECADE DIVIDED BY GAINFULLY OCCUPIED AT THE BEGINNING OF SUCH DECADE.

MARYLAND STATE PLANNING COMMISSION

CHAPTER 4

FURTHER INTERPRETATIONS OF THE STATISTICAL SERIES PRESENTED IN PART III - THEIR UTILITY IN THE DIAGNOSTIC PROCESSES - CONNOTATIONS WHICH RELATE TO THE ECONOMIC STABILITY OF THE STATE AND ITS INDUSTRIAL SECTIONS

In Chapters 2 and 3 of this part we have confined the analysis to interpretations of statistical series relating to population and occupational changes and rates of change in the Nation, the State and the Industrial areas of the State. The time periods considered in these chapters were the over-all period of sixty years (1870-1930) immediately preceding the date of our Base Pattern (1930) and the several decades (six in number) which collectively constitute this over-all period.

The interpretations discussed in this chapter will relate to all of the statistical series developed in Part III, except those referred to in the preceding paragraph, which as stated, have been discussed in Chapters 2 and 3.

It is not the purpose of these articles to present with any degree of completeness the analyses and interpretations of the statistical material of Part III. Those analyses and interpretations which have been presented in Chapters 2 and 3 and those which will be presented in this chapter, have been selected with the following purposes in mind. First; to indicate to the general reader a method by which interpretations of selected statistical materials may be utilized to give direction to the determination of the number and kind of more precise studies requisite to a continuing evaluation of the changing economy of the State and its parts, and a continuing evaluation of contributing causes and the resultant effects. Second; to show the general reader how a collective consideration of the several statistical series, can be utilized as a first step in vali-

dating the interpretations derived from the separate analyses of each of the selected statistical series.

In this chapter the over-all time period considered is from 1909-1937, a period of twenty-eight years. It will be noted that the first twenty years of this period 1909-1929 are prior to the date of our Base Pattern (1930) and are essentially coincident with the last two decades of the 60 year period discussed in Chapters 2 and 3. The remaining eight years of the period, on the other hand, are essentially subsequent to the date of our Base Pattern. As explained in Chapter 5 Part III, this 28 year period (1909-1937) has been divided, for analytic purposes, into several time periods. For the readers convenience however, we define them again:-

The "Secular" Period	1909-1929
The "Terminal" Period	1925-1929
The "1919-1929" Cycle	1919-1929
The "1929-1937" Cycle	1929-1937

As an introduction to the analyses of this chapter, consideration is first given to the three "peak years" of 1919, 1929 and 1937 which, as indicated above define the last two cycles of the 28 year period (1909-1937).

The collective employment in the manufacturing industries of Maryland for each of these years is shown below. The trend of "peak year" employment is shown by the indexes, 1929 being taken as the base year.

	1919[1]	1929	1937
Wage Earners	140342	131099	145932
Index	107.0	100.0	111.3

---

(1) The Census Bureau, following 1919, reports only on establishments having more than $5,000 product value for the year. Previously they had reported on establishments having $500 or more product value. This change influences the number of establishments considerably but due to the small employment in those between $500 and $5000 product value, had little influence on total wage earners and wages.

This trend of "peak employment", showing, as it does a decline from the 1919 to the 1929 peak might be construed, in a general way as an indication of an industrial decline during this period which tends to contradict or invalidate one of the interpretations of Chapter 3, namely, that the constancy of decadal population increase from 1880-1930 was an indication of industrial growth and employment stability during this period. No such conclusion would be justified however, for it can be shown that the war orders during the boom period ending in 1919 much more than account for the excess of employment of the 1919 over the 1929 peak. While it is true that the fighting stopped in November, 1918, all war contracts could not be terminated on that date. As they were later terminated Industry endeavored by various devices, including in some cases ruinous price cutting, to maintain production at the war levels. Labor and management were notably inefficient, if only because of their unfamiliarity with the production of products hurriedly stimulated by the war demands. These and similar influences, directly or indirectly attributable to war conditions accounted for the relatively high employment in 1919.

Consequently if reasonable allowances were made for the purely transitory character of the war demand for products in 1919, Maryland's manufacturing industries would, as will be shown, indicate a continuing upward trend of employment in the three peak years of 1919, 1929 and 1937, and such a condition at least tends to confirm the "interpretation" developed in Chapter 3 relating to the industrial stability of the State. It does so, at least, for the '19-'29 cycle, which happens to essentially coincide with the last decade (1920-1930) of the 50 year period from 1880-1930, the period during which Maryland's rate of population change remained relatively constant.

It will be interesting to see, at this point, how the several industries of the State performed in the boom period (1915-1919) preceding the '19-'29 cycle and also how some of Maryland's "War Industries" fared in post-

war days. For this purpose we refer to Exhibit 9, page 25 Part III, which for convenience we shall call the "Intra-State Chart" since it is designed to show the Intra-State importance of Maryland industries.

The spectacular increase in employment and advance in Intra-State importance of "Other Iron and Steel", "Chemicals" and "Non-ferrous Metals" becomes apparent as we compare the 1919 and 1909 blocks shown on the chart. The growth of employment of these three Maryland Industries corresponds to the national growth of the same industries for the period 1914-1919 (which essentially coincides with the "boom period" of 1915-1919). It is shown in the following tabulation:-

	Percent Increase In Employment	
	U. S.	Md.
Other Iron and Steel	65.7	148.5
Chemical and Allied	36.7	68.9
Non-ferrous Metals	27.2	414.1
The Group collectively	55.7	150.6
Selected Maryland Industries collectively		30.6

The chart very clearly defines three "War Industries" of the State and the tabulation above indicates that they had their share of the War business.

Now if we consider the post-war performance of these three industries, we find an interesting and significant phenomena. While they all, of course, were subjected to post-war recessions, none of them remained at these levels and two of them advanced beyond their prewar positions. This is evidenced by their positions and magnitude in the 1925 block as compared to those of the 1909 block. Because of this, we can say these industries definitely contributed to the industrial growth of the State in the 1920-1930 decade. Two of them, the "Other Iron and Steel" and "Chemicals", behaved very creditably through the terminal period (1925-1929) and for "Chemicals" this trend carried on into the '29-'37 cycle (see Exhibit 14 and Exhibit 17, pages 44 and 50 of Part III) "Other Iron and Steel", however, experienced a decline during the '29-'37 cycle.

In contrast to the generally good behavior of these two industries the "Non-ferrous Metals" Industry did not recover from the post war recession in any great degree. This poor post-war performance carried through both the terminal period (1925-1929) and the '29-'37 cyclical period. The three principal sub-classifications of the "Non-ferrous Metals" Industry in Maryland arranged in the order of magnitude of employment in 1925 were; Stamped and Enameled Ware, Copper, Tin and Sheet Iron and Non-ferrous Metals and their Alloys.

From 1925-1929 employment changes in these sub-classifications were as follows:

> Stamped and Enameled Ware was unreported in the Census of Manufactures in 1929. For the 1925-1931 period its decline was 25%.
> Copper, Tin and Sheet Iron declined 77%.
> Non-ferrous Metals and their Alloys increased 123% in the 1925-1931 period but showed a 30% decline in the '29-'37 cyclical period.

We have at least indicated how two of Maryland's Industries contributed to the Industrial growth of the State by a "normal" expansion from 1921 to 1925 after passing through what might be termed a post-war readjustment process from 1919 to 1921.

At this point we turn to a consideration of another group of "Statistical Series" presented in Part III as shown graphically in Exhibits 12 and 12a, pages 40 and 41. These exhibits show, for the Manufacturing Industries collectively, the trends of Employment, Wages, Product Value and Value Added by Manufacture, for Maryland for the United States for the period 1921-1937. The reader will recognize that this period is comprised of the "recovery" part of the '19-'29 cycle and all of the '29-'37 cycle.

As pointed out in Part III, these plots show that Employment, Wages and Value Added by Manufacture for the Maryland Industries did not rise as high in the 1929 boom and did not fall as low in the 1933 recession

low, as did those of the national group. On the other hand, in Maryland, the values of all three rose in 1937 to points higher than their 1929 values. Contrasted with this the national group showed lower values in 1937 than in 1929.

With these statistical indications before us, as well as our knowledge that the trend of "peak employment" for the peak years 1919, 1929 and 1937 was continuously upward, (assuming a correction of 1919 employment due to the "transitory war orders" as developed earlier in this Chapter) it would seem that the relatively high "Secular Stability" for the period 1919-1937 and the relatively high "Cyclical Stability" for both the '19-'29 cycle and the '29-'37 cycle is clearly indicated for Maryland's Manufacturing Industries collectively. But our Base Pattern has shown us (See Exhibit 2, Page 7, Part III) the preponderant importance of the Manufacturing Industries, in the group of 15 "Predominant Industries" not only in the State as a whole, but also with the exception of Section I-3, in each of the Industrial Sections of the State.

Let us now give a rather particular consideration to the last of our time periods, the '29-'37 cycle, if only for the reason that it most closely approximates a period of current events and current influences.

We started with a Base Pattern (as of 1930) which defined the 15 "Predominant Industries" of Maryland, of which 12 fell under the classification of "Manufacturing Industries". We then developed the "Intra-Sectional Chart" to show how the Intra-State importance of 10 of the 12 Manufacturing Industries of the State was changing, both severally and collectively from 1909-1937. In this time period is, of course, included the '29-'37 cycle which we are now discussing.

The relatively high Cyclical Stability of the Manufacturing Industries collectively has been indicated for the '29-'37 cycle, but it will

be noted, the group of 10 selected Industries included in the Intra-Sectional chart show, collectively, a decline (of employment) from 1929-1937. This evidently calls for an explanation which follows:-

Two of Maryland's twelve Manufacturing Industries "Blast Furnaces and Steel Rolling Mills" and "Automobile Factories and Repair Shops" were omitted from the chart for the reason previously stated, to avoid disclosure of data on individual operations. One of these Industries, "Blast Furnaces and Steel Rolling Mills", was a major factor in establishing the high Cyclical Stability of Maryland in the '29-'37 cycle. Exhibit 16, page 48, Part III, shows a lesser depression drop and a much higher recovery rise than prevailed in the national Industry. It is unfortunate that we can not disclose the numbers employed in this Industry and thus let it take its proper position in the Intra-State Chart. We can assure the reader that we would find this Industry close to the top of the heap in the 1937 block. An "Industry Study" has been made of this Industry -"The Iron and Steel Industry of Maryland" - "Blast Furnaces and Steel Rolling Mills" by Harry A. Grine - Published by the Maryland State Planning Commission in Nov. 1938, and will be discussed at some length in Chapter 7. The cyclical performance of this Industry in part explains the reason for a cyclical increase in employment in the Manufacturing Industries of the State collectively during the '29-'37 cycle whereas the 10 selected Industries showed a cyclical decline for the same period.

There were two other large industrial contributors to the Cyclical Stability of Maryland during the '29-'37 period. These two Industries did not show sufficient gainfully occupied in 1930 to justify their inclusion as "Predominant Industries" in the Base Pattern of 1930. It is the intention to reconstruct the "Sectional" pattern every ten years (On Census of Population Years) and the 1940 pattern will undoubtedly include these two new "Predominant Industries". Their growth of employment from 1929-1937 has been

extremely rapid, so that if to-day they were to be included in the 1937 block of the Intra-State Chart they would rate well up in the Predominant Industries of the State.

The Industrial classifications under which these two Industries would fall are:

"Transportation Equipment" (Aircraft) in the one case and "Rayon and Other Synthetic Yarns" or "Textiles" in the other case. They are represented by the Glenn L. Martin Company in Section I-2 (Baltimore County) and the Celanese Corporation at Cumberland, Maryland.

The three Industries:

Blast Furnaces and Steel Rolling Mills
Rayon and Other Synthetic Yarns
Transportation Equipment (Aircraft)

were major contributors to the Cyclical Stability of the State in the 1929-1937 cycle.

Of the ten Selected Industries, four showed employment gains from 1929-1937 (See Intra-State Chart), they were:

Food and Allied
Chemical and Allied
Leather and Allied
Paper, Printing and Allied

The other six showed employment losses, they were:

Clothing
Other Iron and Steel
Non-Ferrous Metals
Lumber and Allied
Textiles
Clay, Glass and Stone

None of these losses seem to be at all alarming and some were very slight.

The Manufacturing Industries of the State which have shown gains in position in their national group, during the 1929-1937 cycle are:

Food and Allied
Blast Furnaces and Steel Rolling Mills
Leather and Allied
Paper, Printing and Allied

Both of the newer Industries, Transportation Equipment (Aircraft) and Rayon

and Other Synthetic Yarns also show gains in position in their national groups.

Data are not available from the Census of Manufacturers for the Autobobile Industry in Maryland. The remaining eight of the twelve Manufacturing Industries, defined in the Base Pattern have either "broken Even" or shown losses in position in their national groups. If the reader desires he can refer to the group of Exhibits 13 to 24 in Part III in which he will see a graphical delineation of the above conditions for the Several Industries in the employment graphs titled "'29-'37 cycle".

It is hoped that the last few pages will convey at least some idea of the methods used for continuously "indicating" Industrial changes of significance to the economic stability of a state and also for the Industrial Sections of the State. It will be apparent, we presume, in what manner the observance of these Industrial changes gives direction to the number and kind of studies requisite to cause and effect determinations for these observations define those Industries which are undergoing marked change. That these observations and interpretations are, therefore, preparatory to the "diagnostics" to be described in the later chapters of this part, would seem evident.

Still concerning ourselves with the '29-'37 cycle, knowing the preponderant influence of the Manufacturing Industries of the State, with statistical indications of the Cyclical Stability of this group of Maryland Industries in the '29-'37 cycle, (Exhibits 12 and 12a), and with statistical indications of the degree in which the several Manufacturing Industries contributed to the Cyclical Stability of the group as a whole, we can now give consideration to the income trends in Maryland as shown in Exhibit 30, page 82, Part III. As stated in Part III, these income trends of Maryland, when related to those of the nation are themselves an indication of the Cyclical Stability of the State in the '29-'37 cycle.

The points we wish to make now are; first that the Cyclical Stability of the Manufacturing Industries of Maryland, as indicated by Exhibits 12

and 12a, Part III, tend to confirm the Cyclical Stability indicated by the income graphs (Exhibit 30, Part III; and second that our knowledge of the extent to which the several Industries of the State contributed to the Cyclical Stability of the group, begins to explain the indications of Maryland's relatively high stability in the '29-'37 cycle.

We can now revert to a consideration of the over-all time period of 1909-1937. Thus far our consideration, in this chapter, of this period has had to do with; first, the changes in Intra-State importance of Maryland's Industries and second, with the gain or loss of position of the several Industries of the State in their respective national groups. If however, the statistical analyses of this chapter are to be directional to our diagnostics, it will not be sufficient to know that a Maryland Industry has gained or lost position in its national group. It is necessary, if we are to explain the causes of gains or losses of Maryland's Industries, that we have a knowledge of the concomitant gains or losses of that Industry in other parts of the country.

Now the "National Distribution" maps of Part II define, for each of Maryland's Predominant Industries, the "potentially competitive areas "throughout the nation. It then becomes necessary to continuously observe, for each Predominant Industry the "changing importance" of every "potentially competitive area" as defined by the "National Distribution" maps. The method of doing this is illustrated by Exhibits 10 and 11, pages 27 and 29 in Part III.

These two charts have been called the "Inter-State Charts" to distinguish them from the "Intra-State Charts" previously discussed. They relate only to the "Clothing Industry".

We have now discussed, and to some extent interpreted, in Chapters 2, 3 and 4, all of the various statistical series presented in Part III, with one exception, namely, the "Sectional Criteria" which were presented in

Chapter 6 of Part III and illustrated by Exhibits 28 and 29, appearing in the same chapter.

With minor exceptions such as, the population trends and rates of population change in the Industrial areas, we have given little consideration in the three chapters just mentioned to the Sectional Implications of various changes in population growth, occupations, Industrial importance and trends of employment, wages, etc., of the various Industries severally and collectively. We have, up to this point, concerned ourselves with statistical series relating to the State as a whole. In the later chapters of this part we shall devote more space to the sectional significance of the various changes we have been discussing and for this reason defer, for consideration in a later chapter the subject of "Sectional Criteria".

With the exception noted in the preceding paragraph, it is believed that the subject matter of this chapter at least indicates the manner in which the statistical material of Part III may be utilized to indicate continuously important changes of economic significance to the State and to the Industrial Sections of the State. This was one of the purposes of the Chapter. In defining the second purpose of the chapter it was stated or at least implied, that a collective consideration of the several statistical series can be utilized as a first step in validating the separate interpretations of the several series.

In this connection we submit the following:

In Chapter 3, we construed the constancy of the decadal rate of population increase in Maryland from 1880-1930, to indicate for the State a relatively high plane of economic stability throughout the period.

In Chapter 4, we confined ourselves to the consideration of various time periods which collectively covered a long time or secular period

of 28 years. Various interpretations of Chapter 4 are indicative of the sustained Industrial growth or Secular Stability throughout this period. This therefore, tends to confirm for the last two decades of the 1880-1930 period the interpretation of Chapter 3. The "Cyclical Stability" of the State in the several cycles occurring from 1909-1929, (in effect the last two decades of the 1870-1930 period) seems to be clearly indicated by the analyses of Chapter 4. The stability of Maryland in the '29-'37 cycle even though it is in the decade subsequent to the sixty year period considered in Chapter 3, has a very definite relationship to the stability of the preceding cycle of '19-'29. A study of the secular and cyclical characteristics of the two cycles as shown by Exhibits 12 and 12a of Part III indicates this.

Maryland's less precipitous rise from 1921-1929, in the first cycle, unquestionably contributed to her less precipitous decline from 1929-1933 in the last cycle. And finally the Income trends of Maryland in the last cycle in some measure tend to confirm the stability indicated by the trends of employment, wages, etc., shown in Exhibits 12 and 12a of Part III.

We are not trying to prove in these few concluding paragraphs of this chapter that the economic stability of Maryland has been relatively high. As a proof such data would be entirely inadequate. We are merely indicating in outline that none of the "interpretations" in this Chapter in anyway contradict, but on the contrary all tend to confirm one another as well as the interpretations of Chapter 3.

Though not acceptable as proof of stability, it may be said that any lack of concordance of the interpretations would have positively indicated either the fallacy of our reasoning or the invalidity of our statistics. Hence the collective consideration of all interpretations has a definite as well as a useful purpose.

CHAPTER 5

DETERMINATION OF CAUSES AND EFFECTS OF OBSERVED CHANGES IN THE INDUSTRIAL PATTERN

The three preceding chapters of Part IV have been entirely devoted to interpretations of statistical material, which seem to definitely indicate, for the State and all of its "Industrial Economic Sections", except possibly Section H-5, a relatively high stability.

From a "Secular" or long time view-point it is indicated that Maryland's Industrial importance in the nation has consistently increased since the 1880-1890 decade. Consecuently this growth of Industrial importance has extended over a period of from 50 to 60 years.

From a cyclical view-point, the last two "Cycles", the '19-'29 and the '29-'37 cycles have been considered and her relatively high "Cyclical" stability has been indicated by her relatively small "Cyclical Swings" in Employment, Wages and Value Added by Manufacture.

The statistical material indicated that Maryland's growth in Industrial importance was almost entirely in the growth of her "Productive Industries" and her "Intra-Sectional Services". This was accompanied by a decline of importance of her "Extra-Sectional Services". The preponderant importance of her "Manufacturing Industries" and the minor importance of the "Extractive Industries" in the "Productive Industries" is also indicated.

This brings us to a point in our studies where it is necessary to depart from methods of interpreting the statistical material presented in Part III and to turn to the procedures used in explaining the changes of economic significance which these interpretations have indicated.

The interpretations of the Intra-State Chart (Exhibit 9 page 25, Part III) indicate (for the period subsequent to 1909) the growth or decline of the several Predominant Manufacturing Industries as well as their "cyclical" characteristics in the '19-'29 and '29-'37 cycles. They thus indicate *those Industries which contributed (positively or negatively) to the relatively high economic stability indicated for the State.* Obviously it is to these Industries, those which are showing gains or losses in competitive position, we must look if we seek to *explain* changes in the economic stability of the Industrial Sections and of the State as influenced by these changes. The studies of these Selected Industries have been called Industry Studies.

While the statistical material indicated a relatively high economic stability of the Industrial Sections and of the State, it also indicated departures, in some Industries, of such magnitude as to suggest a gain or loss in competitive position and the need of Industry Studies of these Industries.

We shall proceed now to describe in outline the procedures used in these Industry Studies.

Industry Studies:

While in the Industry Studies, certain statistical material, *other than that presented in Part III*, will be used, the studies, as will be seen, are definitely not statistical in character for the reason that the *explanation* of *changes* and causal determinations are not derived from statistical interpretations. Hence our previous statement that it was necessary to depart from methods based solely on statistical interpretations.

First: For the purpose of our Survey, the Industry Studies are confined to *Industries of Predominant importance* to the Industrial Economic Sections of the State, the Predominant Productive Industries and the Extra-Sectional Services.

Second: For the purpose of our Survey, only those Industries are subjected to Industry Studies, which have shown a gain or loss in Inter-State position or importance and consequent gain or loss of Intra-State position or importance.

Third: Industry Studies might more properly have been called Product Studies, for in every case an Industry Study is focused on the study of its Predominant Products.

Rather obviously therefore, we, in our Industry Studies are postulating the changing stability of an Industry to depend on the changing stability of demand for its Predominant Products.

Studies of Predominant Products:

The changing demand for any product can be postulated to depend on two things:-

First, the changing stability of the markets to which it moves (called Market Stability).

Second, the "changing competitive position" of the product in the group of competing products which it meets in the markets to which it moves (called Competitive Group Stability).

Naturally, therefore, granting the soundness of the postulates, an Industry Study must determine, for the local Industry under consideration:

1. The Predominant Products.
2. The Predominant Markets for the Several Predominant Products.
3. The Predominant competing products which collectively make up the "Competitive Group" of products, for each of the "Predominant Markets" (item 2 above) to which the "Predominant Product" moves.

In any "Competitive Group" of products the changing "Competitive Position" of the various products in the group may be said to depend on their relative changes in "unit price" and their relative changes in "quality". If for any product we have some reliable standard for measuring quality we can reduce the above to this statement:

The changing *competitive position* of products in any group of competitive products is dependent on the *relative* change in *price per unit of quality* of the various products constituting the "group".

Therefore any "Industry Study" must, in addition to determining the three items enumerated, also determine:

4. The unit prices of the Predominant Products and the Competing Products.
5. The standards of quality of the Predominant Products and the Competing Products.

In regard to this last item, standard of quality, it may be said that the "ultimate consumer" has at best, a very sketchy and incomplete idea of quality standards. On the other hand in essentially all industries, the trade or the technologist has established what are usually very definite standards of quality, for the raw, processed or semi-processed materials entering into the fabrication of their products. One of the purposes of the Technical Studies, which form part of this survey and which will be described later in this chapter, is to show these standards as developed by the trade and the technologist. In the writer's experience, extending over some twenty years, he has encountered little difficulty in securing, either from the trade or the technologist, adequate standards of quality.

Now since we have predicated the changing stability of an Industry to depend on the stability of demand for its Predominant Products, which in turn depends in part on the changing "Competitive Group Stability" of these products, which again in turn depends on the *relative* change in price per unit of quality of the various products in the Several Competitive Groups, it would seem timely to consider at this point the influences which cause changes in unit price and changes in quality, and also to consider the

manner in which these influences react on unit price and on quality.

We have stated that our Industry Study must determine the Predominant Markets for the several Predominant Products. These market determinations are of several kinds. They must first determine the geographic location of the various markets, or in other words indicate the outlying Sections to which the Predominant Products move. This indicates the transportation involved in bringing a product to its various markets. Second, these market determinations must show the kind of market by indicating whether the "consumer" is an Industry, in which case the particular market is called an "Industry Market" and (the particular Industry consuming the product is specified)or an ultimate consumer, in which case the kind of market is specified as a "Consumer Market". This indicates whether the "Market Stability" is dependent on the Stability of an Industry, as in the former, or on the Stability of a Section, as in the latter case.

Turning now to consideration of the influences causing changes in unit price and quality and to the manner in which those influences react on unit price and quality, the first step is to divide the unit cost at the market into these components:

1. Production Costs (at Plant).
2. Transportation Costs.
3. Distribution Cost.

This must be done for each of the products in a competing group, when it is being analyzed for explanations of the gain or loss of competitive position of the several products of the groups(1).

The next step is to "break down" the Production Costs (item 1) into such components as:

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(1) These "unit costs" determinations are made in the Technical Studies as described later in this chapter.

1. Direct labor.
2. Indirect labor.
3. Direct materials.
4. Indirect materials.
5. Maintenance
   a-Labor
   b-Materials

Other classifications of cost are frequently considered, such as "cost of purchased power", "cost of fuel" when, in the production of the product under consideration, such cost items assume importance.

In the case of products, whose marketing involves high distribution costs a "break down" of such costs similar to the break down of production costs is established.

The purpose of such cost break downs is to establish the relative magnitude of the several cost items in the various products considered. Now not only does the same cost item (such as labor) vary widely in magnitude in different products (labor costs of Maryland coal are about 65% of total costs at plant, while labor costs of Maryland fertilizers are only about 6.5% of total cost) but so also is there a wide variation in relative importance of the various items in the same product which may be occasioned by a great variety of conditions such as different processes for producing the same product, different kinds of raw materials, different plant locations with respect to their markets and raw material sources and different labor rates in different localities. These conditions or as we shall call them "Influences", are continually changing in degree, resulting in widely variant changes in the unit costs of various products constituting a "Competitive Group of Products" which in turn cause changes in competive position or relative importance of the various products of the group.

This brings us to the subject of methods of continuously observing the changes in the predominant influences, and evaluating the changing

effects of these influences on the unit price of the products, and since our ultimate objective is the determination of changes in the quality as well as price, we must include in any study these predominant influences which affect quality as well as those which affect price, and we must be able to evaluate the changing effect of such influences on the quality of the products.

For much the same reason that the important productive Industries of Maryland have been classified under several groups (the fifteen "Predominant Industries" of the State), the "Influences" affecting price and quality have been subdivided under the five catagories shown below;

Industrial Influences
Corporate Influences
Technical Influences
Political Influences
Physical Influences

For the purpose of continuously observing and evaluating the effects of changes in the five Predominant Influences, four types of studies have been adopted;

Industry Studies
Corporate Studies
Technical Studies
Political Studies

The Physical Influences are considered in the Industry Studies, since they relate almost entirely to raw materials and the consideration of raw materials falls under the Industry Study. By Physical Influences are meant such changes as the thinning out of a coal seam, the changing quality of an ore, or any physical change which affects the quality of a raw material or its extraction or recovery costs.

It has seemed necessary first to describe at considerable length in this chapter some of the methods used in an "Industry Study" and to ex-

plain at some length the reasons for using these methods, and then, before completing a description of the "Industry Study" to digress to the subjects of the five Influences and the four types of studies relating to them. The reasons for this seemingly involved presentation follow:

Our purpose in only describing some of the methods used in the "Industry Studies" was to show that the study must among other things develop or determine for the Industry under consideration:

> Its Predominant Products.
> Their Predominant Markets (by kind and geographic location).
> The Competing Products in the Several Markets.

The reason given for the adoption of this procedure or the use of these methods was that the stability of the Industry was postulated to depend on the stability of demand for its Predominant Products, which in turn was postulated to depend in part on the stability of the Predominant Markets and in part on the changing competitive position of the Predominant Products in its group of Competitive Products. Consequently a determination of the Predominant Products, the Predominant Markets and the Competing Products was essential.

We also introduced another postulate, that:

> The changing competitive position of the products in a group of competitive products was dependent on the relative change in price per unit of quality of the various products constituting the group.

This postulate made it necessary that the methods of the Industry Study define:

> The unit prices of the Predominant Products and the Competing Products.
> The Standards of quality of the Predominant Products and the Competing Products.

It seemed timely then to digress from the subject of "Industry Studies" and in order to maintain a thought sequence, to consider the "Influences" affecting the price and quality of the products. This we proceded to do and after indicating the market stability (one of the factors on which depends the stability of demand for a product) was dependent either on the stability of an Industry or a Section.(1) We then reverted to the subject of the influences affecting price and quality, defined the five classifications into which we divide the Influences and showed the four types of studies relating to them.

We believe we have clearly indicated that our method of evaluating the effects of the "Influences" on the Industries is to evaluate the effects of the changing Influences on the unit price and the quality of both the Predominant Products and the Competitive Products. Now all of the five Influences can and do react on both price and quality of products but the manner and extent of the effect of some particular change in influence on the price and quality of the different products affected is widely variant. Thus a change in tariff on imported iron ores might have a pronounced effect on the costs of the Predominant Products of the Steel Industry in Maryland which operates almost entirely on imported ores and no effect on the costs of competing products produced in other steel centers operating on domestic ores. Or a legislative enactment affecting labor rates and hours will affect coal costs to a much greater extent than fertilizer costs.(2)

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(1) It is important to recognize at this point that stability of either the Industry or the Section may be expressed in terms of product stability. This question of Market Stability will be discussed later.

(2) In Maryland, 65% of the coal costs are in labor while only 6.3% of fertilizer costs are in labor.

For this reason it is necessary to know the proportion of total cost accounted for by various cost components of our unit total costs if we are to evaluate the different extent or magnitude of the effects on various products occasioned by some particular change in Influence. Because of this the cost "break downs" described are an essential part of the Industry Studies.

We have already stated that, among other things, an "Industry Study" after defining the Predominant Products of the Industry, must define the geographic locations of the Predominant Markets for these products. We should like, at this point, to state that it also must define the predominant productive areas of the Competing Products.

We have already, in Part II, by means of the National Distribution Maps of those Industries which have been shown to be of great economic importance to the State and its Sections, defined for each of these Industries what we have termed the Potentially Competitive Sections. Now in the Industry Study, as we defined the predominant productive areas of the Competing Products, we define with much more precision those outlying areas which compete with Maryland and which we can now, with considerable justification call the Competitive Sections.

But when the Industry Studies define both the Competitive Sections and the geographic locations of the Predominant Markets, they establish one of the major objectives of the Survey. They establish the Sections of the country to which the Maryland Sections are most closely related in the field of Inter-State commerce and they also define the character of the relationship.

Besides the objectives thus far described, each Industry Study, after defining the Predominant Products of the Industry, is directed to the determination of the following information relating to these products:

1. Production Trends
    a-National
    b-By areas
2. Unit price trends
3. In cases where a product is produced by a small number of corporations, trends of production by corporations.
4. In cases of "Vulnerable Industries"(1) the determination of Predominant Products of the Corporations of such Industries.

This type of information is, of course, statistical. As these trend series are established they become supplemental to the Industrial trends established in Part III, in that they too are indicative of "changes in Base Pattern". Much of this kind of statistical material (often unpublished) has been compiled by Federal and State Departments and Bureaus. Trade and technical journals, trade organizations and various Industrial research groups have proven a most prolific source of such material. When not available from such sources it has rarely been found difficult to secure such materials from corporations producing or using the products when the use to which the material is to be put is explained.

We shall now consider the other three of the four complementary studies, the Technical Studies, the Corporate Studies and the Political Studies. This consideration will be confined to an outline of the objectives of the three studies, with mention of the more important reasons leading to the adoption of this procedure. Both the limitations of space and the purpose of this series of articles prohibit a complete description of methods. The Commission and the writer will be glad to describe the methods in greater detail to those who may be interested in the Industry, Technical and Corporate Studies. A number of case studies are available so that the actual applications of the methods can be shown.

Technical Studies:

No influence has contributed as much to price reduction and to

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(1) "Vulnerable Industries" will be defined later in this Chapter under the caption of "Corporate Studies" so also, under this caption, will be explained the purpose of determining the products of the corporations of such Industries.

qualify improvement as the Technical Influence and this Influence has been felt and has been one of major significance in every field of trade and commerce; in the extraction and recovery of our natural resources, in their fabrication, in their transportation and even in their distribution. We have no wish to over-emphasize the importance of this particular Influence but do wish to emphasize the fact that it is of such importance that it cannot be ignored or treated in any cavalier manner by anyone interested in our economic and social welfare. It must be recognized, it must be evaluated and the magnitude of its influence must be synthesized with the magnitude of the other influences; and these processes must be continuous.

For the purpose of the Survey, the Technical Study is confined to a study of the technology related to those Predominant Products which are showing material gains or losses of competitive position, and in such case also to the Competing Products.

It is a very striking fact that technological processes responsible for the price or quality changes of some particular products are rarely developed by the individual industries producing the products and another striking fact is that changes in one technical process usually cause price or quality changes in quite a number of products. This is tantamount to saying that the number of technical processes affecting products is smaller than the number of products affected. Actually the predominant technical processes affecting Predominant Products are much smaller than the number of Predominant Products affected. In our Technical Studies we have called the predominant technical processes which are thus related to the Predominant Products "Focal Processes". One of the principal purposes of the Technical Study is to determine "Focal Products and Processes". This calls for a description of a "Focal Product".

We frequently find in Industry, particularly in the Chemical Industry, Industrial processes which use, in the process, some product, usually small in amount, which is essential to the process. Thus in the manufacture of rubber tires a small amount of a black pigment recovered from natural gas and known to the trade as Channel Black is used. Its effect is to increase the tensile strength and decrease the abrasion of the tires. Another illustration is platinum or vanadium used as a catalyst in the contact process for making Sulphuric Acid. Diphenylamine, used in the manufacture of smokeless powder for the purpose of retarding the subsequent deterioration of the powder provides another illustration. Such products we have called "Focal Products". Frequently the amounts of these products produced is so small that they do not appear as Predominant Products. Their importance however, because of their effects on the price and quality of products, is so great that they must be considered in the "Technical Study".

The Technical Study, having defined the "Focal Products and Processes" related to the products under consideration, must then develop the technical characteristics of the process, the sources of the products, the uses of both and a clear definition of the products to which they relate(1).

This basic knowledge of the technology of the "Focal Processes" provides the basis for the engineering estimates of unit costs and cost components, developed in the Industry Study and referred to on pages 47 and 48. It also provides the basis for the determination of quality characteristics of the product produced by the process. The determinations of both cost and quality characteristics are a part of the "Technical Study".

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(1) A very interesting study of the Chemical Industry directed to the determination and classification of its Predominant Products and its Focal Products was made under the auspices of the National Research Project of the Works Progress Administration.

Estimates of plant costs per unit of production, based on the technology of the "Focal Processes", can then be prepared for plants producing a product by various processes. The Industry Study defines the types of plants and processes actually in service in a Section. This is primarily for the purpose of evaluating relative capital investment required by the different Industries in the production of their various products.

It might be said that Industry avails itself of technological developments through the medium of obsolescencereplacements, which is only another way of saying that Industry can only avail itself of price reductions and quality improvements made possible by technology by replacing old and relatively inefficient equipment and processes with new and relatively efficient equipment and processes.

Now the rate at which an Industry avails itself of technological developments is of great significance to both the Industry and the community. The rate at which some particular Industry should avail itself of technical developments, for the mutual benefit of Producer, Consumer, Labor, and Investor is also a matter of extreme economic significance. But a knowledge of the rate at which an Industry could avail itself of these technological developments, is of course fundamental to any determination of the rate at which it should do so. Which brings us to another objective of the Technical Studies.

A continuing observation of the technical developments, related to the production of the Predominant Products, combined with a continuing knowledge of the plants and processes actually producing these products (as derived from the Industry Studies) indicates the technical potentialities available to the local Industries for reducing the price or improving the quality of their products. One of the objectives then of the Technical

Study is to continuously develop the predominant changes in the technical art for the purpose of relating them to the changes in the Industrial art (plants and processes) of the State's important Industries as developed by the Industry Studies.

Before concluding this outline of the Technical Studies, it may be said that they definitely indicate, in the case of a potential cost reduction which component or components of cost would be reduced as well as indicating the extent of the reduction.

It should also be remembered that the technology is not directed, as we consider it, solely to the reduction of price and the improvement of quality of the products. It is also directed to the reduction of the capital costs of the plants and processes developed to produce the product. That is to say, a reduction in capital cost per unit of quality of the products produced. Obviously here, as in the case of products cost price is only considered in relation to quality.

Corporate Studies:

For the purpose of this Survey these studies are confined to the Corporations of what we have called the "Vulnerable Industries". The definition of these follows:

When the operations of an Industry are largely confined to the operations of a small number of corporations, it is considered to be more Vulnerable to the corporate policies of its constituent companies than would be an Industry whose operations were conducted by a large number of corporations. Industries of the former kind are called "Vulnerable Industries"(1).

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(1) The term carries no sinister implications nor does the paragraph which in its classification "sets aside" the Industries whose operations are directed by a small number of large corporations.

The only purpose of this classification is that, in the one case individual corporate policies can cause important reactions on their Industry group, while in the other case individual corporate actions are largely offseting in kind and therefore occasion relatively minor reactions on their group.

Now an Industry may be "Vulnerable" nationally or it may be "Vulnerable" locally. The latter statement means only that a small number of corporations may operate in a local Industry while nationally the corporate structure of the Industry might consist of a large number of corporations. If, however, we are to evaluate the stability of a local Industry which is "Vulnerable" from either a national or local viewpoint, it is imperative that we know something of the Corporate Stability of the local operations.

Having indicated the method of selecting the corporations which are to be studied, we can next consider the broad objective of a Corporate Study. The primary objective of the "Corporate Studies" is to determine the corporate stability of the corporations selected by the method just described. But as explained in our discussion of "Product Stability", the word "stability" is always used in a relative sense, and consequently we express the "Corporate Stability" of one corporation by relating it to the "Corporate Stability" of other selected corporations.

In the case of "Product Stability" the products selected for stability determinations were known as "Competitive Products" so in determining "Corporate Stability" the corporations selected for stability determinations will beknown as the "Competitive Corporations". Thus in evaluating "Corporate Stability" we have to consider a Competitive Group of Corporations just as in the evaluation of "Product Stability" we had to consider a "Competitive Group of Products". Obviously if we were

evaluating the stability of the Bethlehem Steel Corporation the "Competitive Group of Corporations" would include the other outstanding corporations of the Steel Industry.

In our Industry Studies, there were devloped trends of certain factors related to the Predominant and Competitive Products. The relative changes of these factors indicated the relative change in Product Stability of the several products constituting the Competitive Group.

We must now in the "Corporate Studies" develop certain factors whose relative trend changes may be accepted as indications of relative change in Corporate Stability of the corporations constituting the Competitive Group of Corporations.

A good starting point in the selection of these factors is a recognition of the fact that because business requires capital, corporate management is quite as much concerned with the problems incident to the financing of its project as it is with the problems incident to the production and marketing of its products. A corporate management has the choice of various methods of financing its project. To illustrate, it may elect to "finance" its plant extensions and obsolescence replacements "out of savings" by the sale of shares of stock (equities) additional to the shares previously outstanding, or by borrowing (usually secured loans - "Bonds"). But whatever method or methods management may from time to time select to finance its operations, they will always be reflected by changes in the Value(1) of the "Securities" of the Corporation (its stocks and bonds).

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(1) Not the price, as will be seen later, trends of prices of Securities should be related to trends of Values of Securities.

Obviously the changing Values of Securities affects the demand for the securities so in the light of the statements presented in the preceding paragraph we may state that;

The Stability of a Corporation depends:

1 - In part on the stability of demand for its Products (as determined by the Industry Studies).

2 - In part on the stability of demand for its securities (This applies to "closely held" stocks, even to such a stock as Ford Motors.) The fact that no stock is offered is not indicative of a lack of demand.

From the material appearing in the published financial statements of the corporations the "Corporate Studies" establish trends of such items as those enumerated below, for the various corporations considered:-

1 - Capital Structure
    a - Stock outstanding (number of shares)
    b - Bonds outstanding

2 - Assets
    a - Fixed - Plant and equipment
    b - Liquid - Surplus (in cash or securities)

3 - Earnings (from operations)

4 - Profits
    a - Distributed (dividends)
    b - Undistributed (to surplus)

5 - General Overhead
    a - Taxes:
        1 - Federal Taxes
        2 - Other Taxes
    b - Sales (cost of)
    c - Debt Charges (interest and amortization of funded debt)

6 - Operating Costs

From market quotations are obtained the material for establishing "price" and "yield" (interest or dividends) on Predominant issues forming

part of the "Capital Structure" (1a and 1b above). These are for the purpose of course, of indicating both relative capital gains (or losses) and relative yields to investors of the principal "issues" under consideration.

The trends of security prices and yields of specific issues are not ordinarily established and considered as a part of the survey. They may be considered only in special studies of a corporation where the "Industry Studies" indicate the loss or threatened loss of competitive position of some corporation of important significance to the economy of the State or its Sections.

The observation of changing collective "equity" of the stock and bond holders in the changing assets (fixed and variable) of a corporation becomes a part of the Industry Studies. These "equity trends" are obviously derived from items 1a and 1b and items 2a and 2b. The observation of changing value (not the price) per share of the stock outstanding also becomes a part of the "Corporate Study". A knowledge of both the "collective equity" of the stock holders and the number of shares outstanding (item 1a) permits of this.

Other series of trends, this time derived from items 3 to 4 inclusive, form an important part of the "Corporate Studies." A somewhat detailed description of these follows:

One can properly think of the trend of "Earnings from Operations" (item 3) of a corporation, as a trend of "Product Value" (total) of the products produced by this corporation. This is a very useful concept for if one observes an important change in the "Earnings from Operations" and wishes to determine the causes (influences) contributing to this change, he will naturally refer first to the "Industry Study" and consider the Pro-

duct Value trends of the Several Predominant Products of the Corporation under consideration. It will be remembered that the industry Study has defined the Predominant Products of the Corporation and has also established, for each of these products, trends of production and trends of unit price. If we know the trend of production of a product and the trend of its unit price, we can, of course, derive the trend of its product value (total)(1). This consideration of the Product Value Trends of the several products will indicate the extent to which the change in each of these has contributed to the change in "Earnings from Operations" of the Corporations.

Having determined by such an examination the products whose product values had changed, we would then turn, again using the "Industry Study" to a consideration of the competitive groups to which our changing products belong. Such a consideration might indicate that the demand for the entire group of products had materially changed.

Rayon is a case in point and the Industry Study of Rayon described later in Chapter 7 will indicate how this study defined the various causes contributing to the rapid rise in demand for essentially all kinds of Rayon Products. On the other hand our consideration of the Competitive Group of Products might indicate that the change in "Earnings from Operations" was occasioned by a gain (or loss) of competitive position of specific products in their competitive groups. If this were in-

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(1) If in a certain time period, production of a product (expressed in physical units of production) has increased 20% and the unit price of the product has increased 10% the total value of products produced will be found to increased 32% (120 x 110 = 132 or 132%).

dicated the Industry Study would then show whether this change in competitive position was due to change in "Price per unit or quality" of changes in "Market Stability."

As another illustration, we can assume, in the "Corporate Study" a "change" has been observed in the operating costs items. Again, for our causal determinations, we would first refer to the "Industry Study." In this case our interest would be in the trends of "unit costs" set up for the several Predominant Products of the Corporation. Then, confining our attention to those products which this examination showed to be materially changing in unit costs, we would next consider the changing "cost components" of these products. Then the three other studies as well as the Industry Study would be considered to determine the extent to which the various influences had contributed to the change in "Operating Costs."

In each of the two illustrations just discussed, having observed trend change in the Corporate Study, we traced back in the Industry Study for indications of causes and being guided by these indications traced back into all four of the Studies for causal determinations. In each case, we have worked from an observed effect back to cause. In either case it might have been that our first observation of "change" or "changes" was derived from the Industry Study. In such case we should have followed through the same channels, which would have led us to the resultant changes in "Earnings" in the one case and "Operating Expenses" in the other as disclosed in the Corporate Study. This time we would have been working from an observed cause to a resultant effect. The point we wish to emphasize is the complementary character of the Technical Study and the Industry Study and consequently established the inter-relationship of the three types of studies. As we discuss the fourth, the Political Study, its relationship to the other studies will be developed.

In using the two illustrations to demonstrate the inter-relationship of the Studies, we hope that we have incidentally conveyed to the reader the idea that such inter-related studies, continuous in character, are essential to diagnostics in any complex structure whose parts are all inter-related, but in which the relationships are continually changing. If so, we have established the need for a continuing economic survey of the State.

Having predicated the stability of a corporation to depend in part on the *stability of demand for its products* and in part on the *stability of demand for its securities* it must now be quite apparent that the Industry Study first indicates the changing demand for the several products of the Corporation and second directs us to the various causes.

Just as the stability of demand for the products of a corporation depends in part on the stability of their product or commodity markets and in part on the gain or loss of competitive position of the products in selected groups (Competitive Groups of Products) so also does the stability of demand for the securities of a corporation depend in part on the stability of security markets and in part on the gain or loss of competitive position of the corporations several securities in selected groups of securities (Competitive Groups of Securities). It can also be stated that, just as with the products, the gain or loss of competitive position of a security is occasioned by relative changes in the price per unit of quality of the several securities in the competitive group of securities.

It is to the "Corporate Study" we look for *indications* of change in the price and quality of the securities, just as we looked to the Industry Study for *indications* of change in the price and quality of products.

The investor in the Security Markets is comparable to the *consumer* in *product* markets. He too establishes, as does the consumer, certain standards of quality. *One of the purposes of the Corporate Study* is to indicate changes in quality of the securities of a Corporation.

The financial data secured from the statements of the several corporations of the Competitive Group of Corporations, (as outlined by items 1 to 6 on page 60) provide us with the material for deriving certain quite conventional standards of "quality." These standards are generally indicative, historically of course, of the relative yields, capital gains (or losses) and security back of the investment in the corporations securities, for the several corporations constituting the competitive group and are thus generally indicative of the changing "quality" of the securities of a corporation (considered collectively), as explained on page 68 - Special studies of a Specific Security can be made when the occasion calls for them. As previously stated "price" changes of securities are available from market quotations. Thus it becomes possible to continuously observe the general trend in price per unit of quality of the securities of a corporation. Another of the functions of the "Corporate Study."

In closing this outline of the objectives of the "Corporate Study" we should like to emphasize the inter-relationship between the financial stability of a corporation, as indicated by the stability of demand for its securities and its Industrial stability as indicated by the stability of demand for its Products. We are all quite conscious of this in a qualitative way; but little has been done to develop methods for quantitatively expressing this ever changing relationship. It is literally

true that there can be no change in "Product Stability" without a coincident change in Security Stability and, of course, the converse is true. Yet in the Industrial world the market analyst persists in disregarding the financial factors and in the financial world the investment analyst persists in disregarding the Industrial factors. Each has qualitative cognisance of both factors yet neither gives a quantitative expression of the changing relationship of these factors. In our description of the Corporate Studies and their relationship to the other studies, we have, it is believed, indicated a method of establishing, quantitatively, the relationship of these financial and Industrial factors on which depends the Stability of a Corporation.

Political Studies

In these studies three classes of "Political Influences" are considered.

1 - Tax Legislation

2 - Regulatory Legislation

3 - Tariffs

Again our problem has to do with the quantitative expression of change in causes (influences), effects and relationships. In this case the particular relationship considered is that existing between government and Industry. Briefly stated, the method designed to accomplish this must evaluate the effect of governmental action, a Political Influence, as manifested by legislative enactments, on the "Industrial Stability" of the several Industries of a Section or the State. But the method must also be designed, this time regarding changes in "Industrial Stability", as causal, to evaluate the resultant effects of such changes on the Resources of

Government (the Counties and the State).

Since in the case of other influences thus far considered (Industrial, Physical, Technical and Corporate) we have continuously observed their changes and then evaluated the effects of these changes on "Industrial Stability" by *measuring* their effect on the unit price and on the quality of products, so in the case of the "Political Influences" must we continuously observe their changes and continuously measure the *resultant* effects on price and quality of Maryland's Predominant Products.

Of course, to begin with we must have a "base pattern" of Maryland's tax structure. In 1930 this was a very simple pattern and is still relatively simple, when contrasted with the complex pattern of many other states. With few exceptions, the only taxing bodies in the State were the cities, the counties and the State, and in each of these the only kind of tax, essentially, was a property tax. (There is now, in addition to the property tax, a state income tax, the former securities tax having been repealed).

When trends of Maryland's taxes per capita are related to those of other states and those of the nation (federal taxes) we find one of the causes, and undoubtedly an important one, contributing to the relatively high "Industrial Stability" both Secular and Cyclical, of the State as developed in the earlier chapters of Part IV.

Now, it is most important to realize the utter inadequacy of such comparisons as those mentioned in the preceding paragraph in evaluating either the effects of taxation on our Industrial economy or the effects of changes in this economy on the revenues of states. Nor, it may be stated here, is it sufficient to know the changing *effect* of *Maryland's*

taxes on the prices and quality of her own products. This is necessary but something more is required if we are to evaluate the effect of Maryland's taxes on the "Industrial Stability" of Maryland's Industries.

As we view it, the stability of an Industry (say a Maryland Industry) is dependent in part on the gain or loss of competitive position as a producer of its products. We should, of course, have knowledge of the effect of Maryland taxes on Maryland products, but we must also have knowledge of the coincident effects on the "Competing Products" of the taxes reacting on them.

As previously explained the "Industry Studies" define the products which compete with our Maryland products, and also define the principal Sections which produce them. Thus the "Industry Study" serves to define the areas (Sections) whose taxes as well as our own taxesmust be considered in the "Political Study." The trends of overlapping taxes in these areas will come from another source. A very useful and competent study of the trends of "overlapping taxes," by counties and by cities has been undertaken by another agency and we have been assured that this information will be made available to us.

Industries, when considering desirable plant locations are interested in relative effect of taxes on product costs in the locations under consideration. Needless to say the decisions resulting from such consideration by Industry are of extreme significance to the political economy of any community. For this reason the observation of tax changes in "Competing Sections" forms a part of the "Political Studies" of Maryland.

The usefulness of such information in the formulation of the budgets and tax and borrowing policies of states, counties and municipalities

is, we presume, apparent. And speaking of borrowing, these studies also serve as a means of evaluating the underlying security of State, County and Municipal Bond Issues, incidentally an important factor in the cost of Debt Services.

It is proposed in the "Political Study" to relate trends of

I - State taxes (total and per capita) to
    a - Those of other States.
    b - Federal taxes.

II - Overlapping taxes of the "Industry Sections" of Maryland to those of "Competing Sections" in other States.

III - For each of the "Predominant Corporations of the State (as defined by Corporate Studies)
    a - Local taxes (total) - to b - Its total Corporate tax (Excluding Federal tax). (From Corporate Studies) the Financial statements of the Several Corporations).
    c - Local taxes (per unit of product value - to d- Its total Corporate tax. (Excluding Federal Tax) per unit of product value.
    c - Local taxes (per unit of product value) to e - Labor Costs (per unit of product value).
    f - Material Costs (per unit of product value).
    g - Total unit cost for each of the "Predominant Products" produced locally by the Predominant Corporation.

Obviously relating 3e to 3d develops for each corporation the importance of the cost item taxes in its Maryland operation as compared to the importance of the same item in all of its operations.

Again obviously relating 3c to 3e, f and g shows respectively the changing relative importance of the cost item-taxes to the cost item-labor, the cost item-material and to the total unit cost of the several products of each of the corporations under consideration.

In determining effects of such "Political Influences" as have been indicated by legislative enactments related to taxes, tariffs in items 1, 2 and 3, page 66or regulatory measures, we confine ourselves to

the consideration of such "changes" in these influences as are known, in the light of our "Industry Studies" and our "Corporate Studies" to exercise important effects on Industrial Stability - which, of course, enormously simplifies our problem.

We conclude this brief outline of the objectives of "Political Studies" with the explanation that by "Regulatory Legislation" is meant legislation other than tax legislation which directly affects the price or the quality of products. It may be stated that there are many illustrations of "Regulatory Legislation" affecting both price and quality. Tax legislation may be considered as directly acting on price alone.

As a conclusion to this chapter, may we emphasize, because of their importance, these points: While, as indicated at the beginning of the chapter, diagnostics calls for other methods than statistical ones, it cannot rest solely on the interpretation of statistical series. These are useful and valuable, in that they indicate the parts of the political - economic structure that are being affected and they indicate the influences which are affecting it. But their function is purely directional. They indicate but they do not explain. The explanations, involving as they do, both causal and effect determinations require a knowledge of the parts - the Industries, the products, the corporations, and a knowledge of the influences - whether corporate, technical or political, which cannot be obtained from statistical material. Without this knowledge the significance of observed "statistical change" is lacking.

In each of the four studies described in this chapter various statistical series have been established in addition to those presented in Part III and interpreted in chapters 2 to 4 of this part.

Now the reason for developing the statistical series presented in the four studies was in no sense academic. These latter series are supplementary to those presented in Part III. To illustrate, the series of Part III indicated the Industries of the State which were gaining or losing competitive position. This definitely pointed out (gave direction to) those Industries which should be studied. The series of the "Industry Studies" defined the products whose gains or losses of competitive position were responsible for the observed Industry Changes. But the Industry Study further shows us for each of the "changing" products, the coincidental changes in price and quality of the products whose competitive positions were undergoing change, and this indicates the causes of the product changes. Finally certain statistical series of all four studies indicate the several "Influences" contributing to the cost and quality changes. Thus the statistical series of the four studies, direct us step by step to fundamental causes. They also, beginning with "a cause," direct us to "ultimate effects(1)." Thus are these series supplementary to those of Part III.

But the "series" of the four studies are also complementary to those of Part III - in this way. The series of the four studies, when established, are kept under continuous observation, they too indicate "changes" in "base pattern" quite as effectively as do the "series" of Part III. Thus they complement the latter as indicators of our changing Industrial pattern.

In this chapter we have concerned ourselves entirely with productive industries and indicated their stability to depend on the "sta-

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(1) Ultimate within the frame of reference of our studies.

bility of demand for their products." In an "Industry Study" which relates to an Industry falling under the classification of "Extra-Sectional Services" precisely the same procedure is followed, but in the latter case we must determine the predominant types of Service where in the former case we determined Predominant Products. As with the "product stability," the "service stability" is predicated to depend in part on the stability of the "markets" for these services and in part on the changing competitive position of the particular service in a selected group of services (a Competitive Group of Services). The Service Industries are fully as susceptible to "market" and "competitive group" determinations as are the Productive Industries.

CHAPTER 6

THE ECONOMIC STABILITY OF STATES - STATES AND SECTIONS AS CONSUMERS. INTERPRETATIONS OF SECTIONAL CRITERIA - CRITERIA AND THEIR USES.

When we speak of the "Economic Stability" of a State or of a Section, we use the term, as we always have used it, in a relative sense. That is to say we do not develop any finite expression of Maryland's economic stability. This, of course, it is impossible to do. What we really do is to indicate the changing economic status of Maryland by relating such change to the changing status of the other states.

But again there is no way of expressing a change of "Economic Status" for any state. We cannot say that in some selected time period Maryland's"Status" has increased 10% or decreased 15%. It is impossible to construct an index of economic status, and if it were possible it would have to be broken down into the factors composing it, and these would have to be analyzed separately to accomplish our ultimate objective of determining the "causes" and "effects" of changing status. We can however, by the methods described, indicate change in economic status of a state by separately indicating the change in certain factors (population, employment, wages, income, state revenues, etc.) pertinent to its economic status. By relating the changes of each of these parts to changes of the same factors in the other states, we indicate the change in economic stability of the State.

But as we have shown, the changes in these factors for the State are derived from our knowledge of the changes in the same factors in the Various Sections of the State.

Thus we may state this postulate:

> The changing Economic Stability of a State depends upon the changing Economic Stability of the Sections of the State.(1)

We may then further state that:

> The factors indicating the changing stability of the State are derived from the factors indicating the changing stability of the Several Sections of the State.

We have previously stated that the changing stability of our "Industrial Sections" (Sectional Stability) is predicated to depend on the changing "Industrial Stability" of the several Predominant Industries of the Section. In Chapter 5 the methods for determining and evaluating the "causes" contributing to changes in "Industrial Stability" and the effects resulting from such changes were described.

Evidently, therefore, these methods also explain the causes and effects of the changing Economic Stability of the State, and of the economic parts of the State (In this case the Industrial Sections).

It will, we presume, be apparent that in thus determining changes in "relative Economic Stability of Maryland," we are in effect continuously defining its changing status in the field of Interstate Commerce, and since we are interested in this field, we are quite as much concerned with what the State buys as with what it sells. As a corollary to this we are quite as much concerned with the stability of demand for the products and services which she buys as with the stability of demand for the products and services which she sells.

Thus far we have concerned ourselves entirely with what Maryland sells. We can now briefly consider; first, what the State (and the Sections)

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(1) The Agricultural as well as the Industrial Sections. As previously stated the Sectional Stability of Agricultural Sections will be developed in later issues of this series. Part III and IV are confined to the Industrial Sections.

buy - what are their "Spending Habits" and second, what is the stability of this demand.

We have found it convenient to classify "consumption" under three heads:-

1. Consumption by Industries.
2. Consumption by Governments (State, County and Municipal).
3. Consumption by Ultimate Consumers.

The "Industry Studies" as they define the kind of raw materials (raw, processed or semi-processed) required for their products as well as the quantities required, define also the kind and quantity of products purchased by Industry.

Adequate material is available to define the "spending habits" (both in kind and in quantity) of the Several Governments of the State. Such material indicates the distribution of revenues for such items as roads, education, health, recreational facilities, etc. Various competent surveys define, with precision adequate to our survey, the "spending habits" of various income brackets, and thus with a knowledge of the several brackets in the State, provide an indication of the "spending habits" of the ultimate consumer.

As to the stability of demand (collectively);

> The stability of demand for products consumed by an Industry depends on the Industrial Stability of such Industry. The stability of demand for products consumed by the governments constituting the political parts of an Economic Section depends on the "Sectional Stability" of each Section.
>
> The stability of demand for products consumed by the ultimate consumers of an Economic Section depends upon the Sectional Stability of such Section.

Consequently the determinations of Industrial Stability as described under Industry Studies in Chapter 5 for the Predominant Industries of Maryland, or the determinations of "Sectional Stability" as described in this chapter

on page 74 for the Industrial Sections of Maryland suffice for the determination of the "stability of demand" for products falling under the three classifications shown on the preceding page.

In this chapter we have stated that the "Sectional Stability" of an Industrial Section is predicated to depend on the "Industrial Stability" of the Industries of the Section. In Part II we classified the Industries of a Section as:

Predominant (productive) Industries.

Extra-Sectional Service Industries.

Intra-Sectional Service Industries.

As we see it therefore, the stability of any Industrial Section literally depends on the stability of all of the Industries of the Section or in other words on the stability of all of the Industries of all of the categories.

Notwithstanding this we have clearly indicated in the earlier parts of this series that the stability of an Industrial Section was in part dependent on the Stability of its Predominant Industries and in part dependent on the Stability of its Extra-Sectional Service Industries.(1) Evidently in so doing we have not considered stability of the Intra-Sectional Services, in our determination of Sectional Stability. The reason for this omission is given in the following paragraph.

As shown in Part II, employment in the Intra-Sectional Group approximates 33-1/3% of the total employment in all Sections.

In disregarding this Industry group in our determination of Sectional Stability, we for the moment assume that the stability of this group varies directly

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(1) It will be remembered that with few exceptions the Extra-Sectional Services occur only in the Urban Sections, consequently in most of the Rural and a few of the Urban Sections the Sectional Stability is predicted to depend solely on the Predominant Industries.

with the combined stability of the other two groups, the Predominant Industries and the Extra-Sectional Service Industries. If such were the case it is obvious that the changing stability of the Section could be properly indicated by the changing stability of the two groups above. Now actually the stability of the one group (the Intra-Sectional Services) does not (except as a coincidence) vary directly with that of the other two Industries. The research however, indicates that this deviation must be small, that is to say, so small that the gain is precision resulting from including the group would not justify the complications resulting from its inclusion.

Consequently the "Sectional Stability" of any Industrial Section is predicated to depend in part on the "Industrial Stability" of its Predominant Industries and in part on the "Industrial Stability" of its Extra-Sectional Services, except in those Sections (usually the Rural Industrial Sections) where no Extra-Sectional Services occur. In such Sections the "Sectional Stability" is predicated to depend solely on the "Industrial Stability" of the Predominant Industries of the Section.

Interpretations of Sectional Criteria

Chapter 4 was devoted to the interpretation of the Statistical Studies of Part III, indicating "changes in Base Pattern." In chapter 4 we, as stated, postponed any consideration of Sectional Criteria. These criteria, as their name implies, relate to the subject of "Sectional Stability" and it was felt that a discussion of them would be more understandable if it followed chapter 5 on the four studies and the four influences, as well as the material thus far presented in this chapter and which also relates to Sectional Stability.

The purpose of these Criteria as well as the method of constructing them has been described in considerable detail in chapter 7 of Part III

and will be expanded later in this chapter. Briefly stated, they indicated for each Industrial Section of the State a trend of employment which would have prevailed in the Section if local employment trends in the several Industries of the Section had precisely followed the national trends of these same Industries.

These Criteria are, it will be seen, confined thus far to the time period which we have called the '29-'37 cycle. Our interpretations of the Statistical material of Part III(1) indicated, among other things, the following:

> The great importance of the Manufacturing industries in the group of Predominant Industries of the State. (12 of the Predominant Industries were Manufacturing Industries. Of the remaining 3 only one "Building" was of State importance, and only 2 of the three "Building" and "Coal" were of (Sectional Importance).
>
> Collectively the Manufacturing Industries of the State showed high "Cyclical Stability" in the '29-'37 Cycle. In this cycle the Manufacturing Industries of Maryland collectively did not drop as low in employment, wages or value added by manufacture as did those of the nation. In 1937 the Maryland industries rose to higher levels (as compared with 1929 levels) than did those of the Nation. That the collective gain of Maryland's Manufacturing Industries was in large measure due to the net effect of gains or losses in the Industries shown below during the '29-'37 cycle:

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(1) These interpretations constituted the subject matter of Chapter 4 Part IV.

Industries Gaining:

- Blast Furnaces and Steel Rolling Mills
- Air-Craft Manufacturing
- Rayon
- Food and Allied
- Paper, Printing and Allied
- Leather and Allied

Industries Losing:

- Clothing
- Other Iron and Steel
- Non-Ferrous Metals
- Chemicals and Allied
- Stone, Glass and Clay Products
- Lumber and Allied

Now it so happens that our "Industry Studies" have progressed sufficiently to enable us to define, with reasonable precision, the "geographic distribution" of the plants of thos Industries which have shown gains or losses in the '29-'37 cycle as listed above. Our Base Pattern indicates the "geographic distribution" of the workers (their place of residence).

With this information before us, and with a knowledge of the extent of the gain or loss of the several Industries listed above(1) it seems to be indicated very definitely that the "Sectional Departures" of the following Sections will be positive.

Urban Sections

Baltimore
Cumberland

Rural Industrial Sections:
I - 2 (Baltimore County)
I - 3 (Anne Arundel and Prince George's Counties)

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(1) To avoid disclosures of the operations of individual corporations we have not, as previously explained, shown gains or losses of employment in several of the Industries listed. It so happens that the greatest gains occurred in such "Vulerable" Industries.

Our "Industry Studies" have not progressed sufficiently to say at this time whether the other Urban Section of Hagerstown and the Rural Industrial Section H-5 (Garrett and Allegany Counties) will show positive or negative Sectional Departures.

While we have had a great deal to say about Criteria and Departures in chapter 7 of Part III, we believe we are now, in the light of the preceding chapters of Part IV, in a much better position to recognize the significance of the material presented in the rest of this chapter which will relate entirely to Criteria and their uses.

Criteria and Their Uses:

Two kinds of Criteria are used in our studies:

Industry Criteria

Sectional Criteria

Sectionalization defines the Economic Sections, the Predominant Industries of such Sections, and shows the relative importance of the Industries in such Sections. Collectively the Predominant Industries of all Sections fall under 20 Industrial Group Classifications.

Industry Criteria:

The National trends of employment in each of these twenty Industries is known as the "Industry Criteria" of each Industry. These continuing trends have been established.

Subclassifications have been established for the 20 Predominant Industry Groups. There are a total of 280 subclassifications for the 20 main groups. Continuing national employment trends of these 280 Industry

subclassifications have been established. Thus each Predominant Industry is composed of a number of subclassifications which we refer to as sub-industries.

Industry Departures:

The denotion (plus or minus), of the sub-industry trend from the trend of its Predominant Industry is known as the "Industry Departure" of such sub-industry. Thus if in a selected time period, employment in a Predominant Industry Group has increased 40%, while in the same period one of the sub-industries of the group has declined 10%, the sub-industry is said to have a "Negative Departure" of -50% (the algebraic difference of the two trends.)

Industry Stability:

The sub-industries, of a Predominant Industry Group, which for any selected time period, show positive departures, are said to be gaining "Industry Stability' while those sub-industries, which for the same period show negative departures, are said to be losing "Industry Stability." The relative stability of the various sub-industries of a "Predominant Industry Group," for any time period is thus expressed by their relative "Industry Departures." Thus, instead of expressing the trends of sub-industries directly we express such trends in every case as a departure from a common norm or criteria - The Industry Criteria. In Mathematical parlance, we are expressing one Variable (the relative Stability of the Sections) as a "function" of another Variable (the Industry Criteria). But as will be seen later a large number of other Variables will be expressed as other functions of the Industry Criteria. The need of such procedure is evident and hence the use of the Industry Criteria.

Sectional Labor Supply and Demand:

Supply: Assume the Base Pattern of a selected Section to be shown below for two Census Years 1930 and 1940.(1)

Gainfully Occupied

By Numbers and Percent of Total

	1930	1940
Productive Industry	A - 4000 - 40	2000 - 22
Productive Industry	B - 2000 - 20	3000 - 33
Productive Industry	C - 1000 - 10	1500 - 17
Other Productive Industries	- 3000 - 30	2500 - 28
Total Productive Industries	- 10000 - 100	9000 - 100

From these data may be calculated the following trends for the period 1930-1940.

Occupational Trends

1930 - 1940

Productive Industry	A -	- .50
Productive Industry	B -	+ .50
Productive Industry	C -	+ .50
Other Productive Industries	-	- .17
Total Productive Industries	-	- .10

These are called "Occupational Trends" and indicate the tendency of changing labor supply under the Industry Classifications shown for the 1930-1940 period. The difference in "Occupational Distribution" of the three Predominant Industries (40, 20, 10, in 1930) and 22, 33, 17 in 1940 will be noted.

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(1) As with all "parts of our economic structure," the Section boundaries and the Section Patterns continuously change. Consequently the nation must be "re-sectionalized" every 10 years, on Census Years. In assuming the time period 1930-1940 the year 1940 is presumed, of course, to have passed.

Demand: The changing labor demand in the Section for the same period is indicated by trends of employment ("Employment Trends") in *the same classifications* as shown under "Supply." These trends are established.

Relationship of Supply to Demand:

Obviously this relationship is continuously changing in the Section *as a whole*, and also in *each of the Industry Classifications*. It is apparent that as the *supply* changes in the Several Classifications, the "Occupational Distribution" must change; and as the *demand* changes in the Several Classifications, the "*Employment Distribution*" must change.

Again obviously, if at any time the demand in any Industry Classification of a Section exceeds its supply, the excess demand must be supplied from another Section. (The Bethlehem Steel operation in Baltimore County is a case in point, the excess coming from Baltimore City.)(1) On the contrary an excess of supply over demand in any Industry Classification is indicative of unemployment *in that classification*.

When, in any classification of a Section, the "employment trend" is related to the "occupational trend", "negative departure" of the former from the latter "indicate" unemployment. The significance of comparing such departures for the *same Industry*, in *different Sections* is evident. Such conditions are definite influences affecting population shifts.

Sectional Criteria:

A Sectional Criteria is a composite of the *National Trends* of the Predominant Industries (Industry Criteria) of the Section weighed ac-

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(1) The Industry Study of Blast Furnaces and Steel Rolling Mills shows the "demand" in 1930 to greatly exceed the "supply" in Baltimore County. (Note the numbers occupied in "Blast Furnaces and Steel Rolling Mills," as shown in the Base Pattern of Section I-2 (Baltimore County) and Baltimore City.)

cording to the "Occupational Distribution" of these Industries in 1930, the beginning of the 1930-1940 period. Consequently, since the "Industry Criteria" are employment (not occupational) trends, the Sectional Criteria may be said to represent the employment trend of the Section in cases where;

1 - The "Occupational Distribution" equals the "Employment Distribution."

and where:

2 - None of the "Predominant Industries" are gaining or losing "Industry Stability."(1)

As we are quite aware that no such conditions as the two mentioned can exist, except by chance, a very remote chance at that, we can now proceed to "correct the Criteria for departures."

This is done in two steps:

Sectional Departures:

First; still assuming the Occupational Distribution to equal the Employment Distribution, construct an occupational trend which is a composite of the local trends(2) of occupations in the Predominant Industries of the Section. If this trend is plotted and related to the plot of the Sectional Criteria, its departure (Sectional Departure) at the end of our time period (1940) will be found to equal the algebraic sum of the "Industry Departures" of the Several Predominant Industries of the Section at the end of the same time period (1940) thus the Sectional Departure is expressed in terms of the Industry Departures which caused it (a causal determination).

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(1) The use of the "national trends" of the Predominant Industries (see description of "Sectional Criteria" at the beginning of Caption) denotes this.

(2) The local trend of a Predominant Industry is the Composite trend of the "Reporting Plants" of such Industry as obtained from the Bureau of Labor Statistics Series. For example the Maryland Bureau of Labor Statistics Series.

Second: If now we plot a third trend which will be constructed in the same way as the second trend (the first trend being the "Sectional Criteria"), except that in making this third composite trend we shall "weight" the several Predominant Industries by their "Employment Distribution" rather than by the "Occupational Distribution" used in the Sectional Criteria and also in the second or occupational trend, we shall see that it will depart from the second curve in 1940. We can conveniently think of the cause of this last Departure as the difference between the "Occupational Distribution" and the "Employment Distribution" of the Predominant Industries of the Section.

This third curve is the true *demand trend* of the Section and can now be compared with the *supply trend* (the Occupational trend) described under the caption "Supply."

In constructing this employment trend curve the same Industries must be included as those shown in the Base Pattern of the Section. Thus in the assumed Section described on page 82, employment in Industries A, B and C must be included in the employment trend of the Section, even though the operations of Industy A lie in another Section. Thus the employment trend of "Blast Furnaces and Steel Rolling Mills" must be included in the employment trend of the Urban Section of Baltimore even though this operation is located in another Section. (Rural Industrial Section I-2.)

In cases where one of the Predominant Industries is located in another Section than the one under consideration (assume Industry A in the Section discussed on page 82, lay outside the Section) a fourth trend is plotted identical with the third plot except that now this plot is a composite of the two Industries C and D and the "Employment Distribution" of these two Industries in 1930 is used thus establishing employment trend

in the local Industries. Obviously when this trend is related to that of the third plot, the relative trend of *all* the Industries on which the Section's workers depend, and the local Industries on which they depend is established.

Evidently we might have plotted this demand curve directly and determined thus the *total Departure* from the Criteria but we would have no knowledge of the causes of the total Departure. In our two step method however, we differentiated the two causes of Departures. The Industry Departures were the "cause" in the first case and differences in Occupational and Employment distributions were the cause in the second case.

The only reason for doing this is for convenience in our analytical processes. The two causes which have been treated as though they were separate are not separate, for as we have shown before, the "change" in "Employment Distribution" is caused by the changes in Industry Stability, and therefore, in reality there is only one cause, the relative Industry Stability of the *local* Industries of the Section.

In some cases, however, it is convenient to think in terms of "distributions change" and in some cases in terms of "Industry Stability Change," always realizing that the former is a function of the latter, and by the use of the methods described, can be expressed in terms of the latter.

Sectional Stability:

This too is a relative term, just as was the term "Industry Stability." It will be remembered how one expressed changes in the Industry Stability (gains or losses) by Industry Departures (plus or minus) from the several Industry Criteria. So in the case of the Sections do we express the relative Stability of the Sections in terms of their Sectional Departures from the Several Sectional Criteria. The *use* of Sectional Cri-

teria is thus indicated.

We have stated that the changing demand for labor in any Section is indicated by the Employment trend of such Section; that this Employment trend can be expressed in terms of the Sectional Criterion of such Section; corrected for local departures; that a Sectional Criterion can be expressed in terms of the Industry Criteria (corrected for local departures) of the various Predominant Industries of such Section. The purpose of all of this is to relate the changing demand for labor in a community (the Section) to the changing demands for labor of the several local Industries (the Predominant Industries of the Section); to then relate, in each of these local Industries, this changing labor demand to the changing product demand, the changing wages and the changing value of Products (by means of the Industry Studies and the Technical Studies); having established these relationships, to determine the causes contributing to any observed change (by means of the four types of "Studies"); and then, by means of the interrelationships described in this chapter between Industries and Communities, to determine and evaluate resultant effects.

As a conclusion to this chapter we revert to the subject of labor supply and the labor demand of a Section and their relationship. The preceding paragraph has dealt solely with factors relative to the labor demand of a Section. It is not within the province of Part IV to discuss the factors pertinent to the changing labor supply of Sections. This must await a later publication.

Though this relationship between supply and demand is continuously changing as supply and demand severally change in apparently unrelated ways, these two are not unrelated, they are very definitely related and there can

be no change in the one without a resultant change in the other. Hence as we develop the so called "Industry Studies" they largely, because they show resultant effects on State, County and City revenue, on income of their residents and on the interrelationships between the Stability of the Various Sections, show many of the causes of the changes in labor supply of the Sections.

Market Stability:

We have previously commented on the two "kinds" of markets considered in the Industry Studies, namely Industry Markets and Consumer Markets. One of the important uses of the Criteria is to continuously indicate the changing stability of the markets to which the Predominant Products of a Section move. The Industry Criteria corrected for departures show the changing stability of the Industry Markets and the Sectional Criteria, corrected for departures show the changing stability of the Consumer Markets.

CHAPTER 7

SUMMARIES OF SEVERAL INDUSTRY STUDIES: CLOTHING - FERTILIZER - BLAST FURNACES & STEEL ROLLING MILLS - COAL - RAYON - PORT OF BALTIMORE

As the chapter topics indicate, five of the six Industries discussed in this chapter are "Productive Industries" and one of the six, the "Port of Baltimore" is an "Extra-Sectional Service" Industry.

The various "Industry Studies" which have been made and others to be made in the continuous economic survey of Maryland may be classified under two heads or categories:

1. - General Studies
2. - Local Studies

A general study of an Industry may be defined as one whose scope encompasses the national field of the Industry. It is concerned primarily with the predominant products of the Industry, the more important productive areas engaged in the extraction or fabrication of such products, and the more important markets and kinds of markets to which these products move.

A local study of an Industry concerns itself primarily only with the predominant products produced in the local area under consideration. It also quite definitely concerns itself with competing productive areas of these products, wherever these competing areas may be located, and with the more important markets and kinds of markets for these locally produced products. Obviously, therefore, a general study of the kind indicated may or may not contribute materially to the "diagnostics" of some local operation. Generally speaking, if the local operation is of sufficient magnitude as to give it a national significance, a "general study" of the Industry to which the local operation belongs will contribute to the "diag-

nostics" of the local Industry. Otherwise it will not.

Of the six "Industry Studies," three are "General Studies":

Coal
Rayon
Port of Baltimore

while three are "Local Studies":

Clothing
Fertilizer
Blast Furnaces & Steel Rolling Mills

Now, of the six Industries enumerated, four - the Port of Baltimore, Clothing, Fertilizer, and Blast Furnaces & Steel Rolling Mills - besides being extremely important to their "Sections," have a major significance to the economy of the State, if only because of their magnitude. On the other hand, two of the Industries, while having great sectional importance, are relatively of small importance to the State as a whole.

The coal Industry relates to Section H-5 and Rayon to the Urban Section, Cumberland. The four remaining Industries relate principally to the Industrial area of Baltimore.

In the summaries of these six "Industry Studies" which are to follow, certain parts of the studies have been emphasized, while other parts have been almost or completely ignored. It is believed that Chapters 3 and 4 indicate, with sufficient completeness, the reasons for the emphasis. But even if these chapters fail in this respect, the economic significance of emphasizing those parts which have been emphasized would now seem to be rather obvious, even to one not familiar with the methods of the continuing economic survey.

Abbreviations for the bibliographic references used in the summaries are given below:

Industry	Industry Study	Author	Abbreviation
Coal	The Bituminous Coal Industry with a Survey of Competing Fuels	W.C. Trapnell Ralph Ilsley	Coal, T. & I.
Rayon	The Rayon Industry	W.C. Trapnell	Rayon, T.
Port of Baltimore	A Preliminary Economic Analysis of the Shipping Industry	James M.S.Waring	Shipping, W.
Clothing	Men's Clothing Industry	A. A. Imberman	Clothing, I.
Fertilizer	The Fertilizer Industry	A. A. Imberman	Fertilizer, I.
Blast Furnaces and Steel Rolling Mills	The Iron and Steel Industry	Harry A. Grine	Steel, G.

The summaries of the six Industry Studies follow.

THE CLOTHING INDUSTRY

(A Local Study) (1)

Reason for Study: Observation of Employment Indices in Clothing, both State and National (B.L.S. Series) indicated a delayed recovery of Maryland employment.

The Indications of the Study

The Predominant Product: Low-priced men's clothing.

Plant Locations: Highly concentrated in Baltimore City. Indications of plant shifts from Baltimore to outlying localities in the State (2). Indications of cessation of shift (3).

Secular Characteristics: Employment declined steadily prior to 1930. Note decline of about 40%, 1923-1929 in Maryland as compared to no decline in national clothing for the same period (4). (Maryland thus showed a negative "secular departure" in employment of 19.6%).

Cyclical Characteristics: (4) In the '29-'37 cycle, the "recession" of national employment in men's clothing was 13.7% (employment 86.3% of '29 employment). The "recession" of Maryland employment in men's clothing for the same period was 15.2%, Maryland employment thus showed a small negative cyclical departure for the period. But in the recovery phase of the '29-'37 cycle, national employment rose 16.6%, while Maryland clothing rose only 8.5%. Maryland thus showed a "negative departure" of 8.1% in its "recovery."

Causes Contributing: Imberman, while he cites several contributing causes, such as Union restrictions on types of garments produced in Baltimore (5),

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(1) For all bibliographic references, see explanations at end of summary on this industry.

defines the major cause of the poor recovery characteristic in employment as plant migration(6). He reaches a definite conclusion(7) that migration from Baltimore has stopped, and clearly states, or at least implies, that such migration as did occur was not ascribable to any generically unfavorable condition peculiar to Baltimore.

Influences: Labor costs appear as a fairly high percentage of the unit costs of the garments, from 28 to 37%(8). This, together with the magnitude of the Industry in Maryland, makes any influence reacting on labor costs one of great importance. Therefore, either "Political Influences"(9) or "Industrial Influences"(10) which regulate wages or hours assume a major significance. Consequently, in the case of the Clothing Industry of Maryland, "Political" and "Industrial" influences are considered of predominant importance among the five types of influences.

Kind of Markets: In this Industry, the "kind" of market falls under our classification of "Ultimate Consumer Marekts." The geographic locations of markets for Maryland clothing are very widely distributed throughout the country(11).

Competitive Products: In this Industry, the types or categories of low-priced men's clothing are defined by the trade with considerable precision(12) and these categories serve to define the "types of competitive products" which Baltimore or Maryland clothing meets in its various markets.

Bibliographic References - The Clothing Industry

(1) Clothing, I.

(2) Clothing, I., p. 37.

(3) Clothing, I., p. 143.

(4) Clothing, I., Exhibit 1.

(5) Clothing, I., pp. 128, 147.

(6) Clothing, I., Exhibit 1; also pp. 20, 141, 148.

(7) Clothing, I., p. 148.

(8) Clothing, I., p. 89.

(9) Regulatory legislation such as the Wages & Hours Act and Social Security legislation fall under our classification "Political Influences." Union regulations relating to wages and hours fall under our classification, "Industrial Influences."

(10) Same as (9).

(11) Clothing, I., p. 21.

(12) Clothing, I., p. 128.

THE FERTILIZER INDUSTRY

(A Local Study) (1)

Reason for Study. Observation of the "technical study" of the fertilizer industry indicated, first, the desirability of increasing plant food content of fertilizers for economic reasons; 2nd, the availability of technological processes for producing higher concentrations at lower costs per unit of plant food. What the trade knows as a complete fertilizer contains three types of plant foods (nitrates, phosphates and potash). In 1920, the plant food concentration of an average mix was about 14%; that is to say, each short ton of fertilizer contained 280 pounds of these plant food ingredients. The average mix at that time was known to the trade as a 3-8-3 mix, indicating that of the 14% plant food, 3% was nitrates, 8% phosphates, and 3% potash. The trend of increasing plant food concentration has been from about 14% in 1920 to about 18% in 1930(2).

The Indications of the Study

The Predominant Products: Superphosphate; Mixed Fertilizers. Actually, superphosphate is essentially the only manufactured product in this industry. The preparation of mixed fertilizers is not a manufacturing process, but a mixing process. While the concentration of mixed fertilizers has increased, as stated above, from 14% concentration to 20% concentration, the concentration of the phosphate content has not increased as rapidly(3) but has tended to adhere to what the trade knows as standard superphosphate containing about 16 to 18% available phosphoric acid(4), the bulk of which is made by what is known in the trade as the "west process." The technological studies indicate that technical methods are now available for making

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(1) For all bibliographic references, see explanation at end of this summary.

more highly concentrated superphosphates by both the "wet process" and other processes.

Plant Locations: The principal plant locations of the fertlizer industry are indicated in the industry study(5).

Secular Characteristics: Imberman shows that Maryland has for a number of years been the largest fertilizer producing state in the nation, both from a production(6) and an employment(7) viewpoint. Their first place in production applies to both products - superphosphate and mixed fertilizer.

Cyclical Characteristics: In the '29-'37 cycle, the fertilizer industry showed good cyclical characteristics. In the case of production(8) Maryland fertilizer fell to a "recession low" of 72.9% as contrasted with a national "recession low" of 55.8%, thus showing a good positive departure for the "recession low." In recovery, Maryland fertilizer had recovered to 77.3% in 1935 as contrasted with a recovery of 69.3% in national fertilizer production. In the case of employment(9), Maryland fertilizer showed a slight negative departure in its "recession low" (56.7% as compared with 62.4% for the nation). Its recovery characteristic showed practically no departure; it very closely paralleled that of the national characteristic.

Causes Contributing: Imberman points out that the large volume of superphosphate produced in Maryland in part accounts for the sustained demand for Maryland fertilizer in recessions, because the demand for this product does have a notably higher stability than that for mixed fertilizer. Another and very important cause is the higher stability of Maryland markets for mixed fertilizer. A large part of Maryland's production moves to the Northeast Atlantic States, notably New York, Pennsylvania, Maryland, Maine, Massachusetts, New Jersey. In the '29-'37 cycle, the consumption of ferti-

lizer nationally dropped to a "recession low" of 54.4, while the lowest "recession low" of the states named occurred in Pennsylvania and was only 72.6(10). That is to say, the stability of demand for Maryland products is in part due to the predominant importance of the production of superphosphate and in part due to the stability of the markets to which the Maryland fertilizer moves.

Influences: Influences on labor costs, whether "political" or "industrial" are relatively unimportant, because labor costs are only about 6.3% of the unit costs of these products(11). The industry will undoubtedly in the future avail itself of the developed technology directed to producing the more concentrated superphosphates at lower costs per unit of plant food content. To accomplish this, however, the industry will have to make appreciable capital expenditures. While there are certain exceptions, the corporate studies of some of the major producers in the fertilizer industry do not show and have not shown very good records of financial stability. As the ability of a corporation to avail itself of developed technology depends in large measure on the financial stability of a corporation, it will, we presume, be evident that two of the influences of very vital importance to the future of the Maryland fertilizer industry are:

Technological Influences.

Corporate Influences.

Kind of Markets: In this industry, the "kind" of market falls under both classifications, the mixed fertilizer moving to "ultimate consumer markets," while the superphosphate moves to "Industry markets." (Maryland superphosphates move to the dry mix plants)(12).

Bibliographic References - The Fertilizer Industry

(1) Fertilizer, I.

(2) Fertilizer, I.,p. 35.

(3) Fertilizer, I., p. 88.

(4) Fertilizer, I., p. 19.

(5) Fertilizer, I., p. 21.

(6) Fertilizer, I., p. 23.

(7) Fertilizer, I., p. 66.

(8) Fertilizer, I., p. 23.

(9) Fertilizer, I., p. 64.

(10) Fertilizer, I., p. 25.

(11) Fertilizer, I., p. 80.

(12) Fertilizer, I., p. 15.

BLAST FURNACES & STEEL ROLLING MILLS

(A Local Study) (1)

Reason for Study: Observation of employment indices in this Industry - both State and National (B.L.S. Series) - indicated a more rapid recovery in Maryland compared with the National Industry.

The Indications of the Study

The Predominant Products: The predominant products of the Maryland Industry are, in a group, generally classified among "lighter Steel Products." In 1936, the predominant products of the Maryland operation in the order of their predominance were: Plates, Tin Plates, Sheets, Wire Rods. These four products representing over 70% of the tonnage production of the Maryland operations(2).

Plant Locations: The Maryland plants of this Industry are, with minor exceptions entirely concentrated in Baltimore County.

Secular Characteristics: The Steel Industry of Maryland nearly reached a point of extinction in the early eighties(3). It then began a period of renaissance in 1887 at the time of the construction of the Maryland Steel Company's plant at Steelton in Baltimore County. This operation raised Maryland's position in the industry to that of the ninth producing state(4). In 1916, the Bethlehem Steel Corporation acquired these properties and has steadily increased plant capacities, so that now the Bethlehem's Maryland operation is among the first ten of the plants of the country engaged in the production of pig iron and rolled steel products(5).

Cyclical Characteristics: From the standpoint of employment, production and wages, this Maryland Industry has shown strikingly good cyclical

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(1) For all bibliographic references, see explanation at the end of this summary.

characteristics during the '29-'37 cycle(6). It may be noted here that in 1937, employment in this Maryland Industry rose to 163% of its '29 employment, as contrasted with a rise in the national Industry to 118% in the same year. Thus, the Maryland Industry showed extremely high positive departures in the '29-'37 cycle. The importance of this will be evident because of the magnitude of employment in this Maryland Industry. The 1930 census showed about 16,000 gainfully occupied in this Industry(7)

Causes Contributing: The causes contributing to both the secular expansion and the good cyclical performance of this Industry seemed to centralize very definitely on the corporate policies and the corporate stability of the Bethlehem Steel Corporation. It has concentrated more and more on the production of the more stable and expanding lighter steel products, and it has concentrated its production in these products more and more in the Maryland operation(8). The policy of the Bethlehem Company in concentrating its operations in the production of certain lighter steel products in Maryland plant is shown in the Industry study(9). This expansion of production of these products in the Baltimore operation can be attributed to the very complete modernization of these plants, involving large capital investments(10).

Influences: Largely because of the magnitude of this operation and its extreme importance to the economic status of the Baltimore Industrial Area and the State, the continued observation of all five of the influences assumes an importance. It may be said in regard to the physical influences that these operations utilize almost exclusively foreign ores from mines in Chile and Cuba. These are high grade, low cost ores from operations owned or controlled by the Bethlehem Steel Corporation(11).

Kind of Markets: All of the predominant products of this operation move exclusively to "Industry markets."

Competitive Products: The competitive products met by the different predominant products in the various Industry Markets have been established with reasonable precision.

Bibliographic References - Blast Furnaces and Steel

(1) Steel, G.

(2) Steel, G., p. 45.

(3) Steel, G., p. 10.

(4) Steel, G., p. 11.

(5) Steel, G., p. 13.

(6) Steel, G., pp. 62 and 65.

(7) Steel, G., p. 50.

(8) Steel, G., pp. 15 and 95-98.

(9) Steel, G., p. 17.

(10) Steel, G., p. 96.

(11) Steel, G., p. 13.

COAL

(A General Study)[1]

Reason for Study: An observation of the general study of coal indicated, first, the extent to which bituminous coal had lost competitive position in the fuels group; and second, a loss in competitive position of the Somerset-Meyersdale[2] and Cumberland-Piedmont districts (in which the Maryland operations are located), both in the Appalachian field and in the national Industry. A supplementary and outline study of the Maryland operations was then made.

The Indications of the Study

The Maryland coal operations are confined to the two western counties of the State, namely Garrett and Allegany Counties. Consideration was given in a general way to the types of use to which this coal was best adapted.

Secular Characteristics: The supplementary study of Maryland coal indicated a very definite loss of competitive position in the Maryland operations - much greater, in fact, than that of the field in which it is located. This is best illustrated by the following figures: In the national Industry, production declined from a peak (1926) of about 570 million tons to about 310 million tons in 1932. On the other hand, Maryland coal began a sharp decline, following its 1920 peak; in other words, its decline antedated that of the national decline by about six years. The Maryland operations dropped from a production of 4,000,000 net tons in 1920 to a low of 1,600,000 in 1933, or in other words, the national bituminous production dropped to 60% in its decline ending with 1932, while the Maryland production dropped to 40% in its decline ending with 1933.

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(1) All bibliographic references are explained at the end of this summary.

Cyclical Characteristics: During the '29-'37 cycle, the cyclical performance of Maryland's coal showed no pronounced departures either in recession lows or recoveries from the national performance.

Causes Contributing: The general coal study indicated high production costs in the Maryland district, as well as a high labor cost(3). Examination of conditions in the Maryland field and in competing fields indicated that the competing fields have mechanized to a much greater extent than the Maryland fields, which in large measure explains the relatively low cost in the competing fields. Freight rates, both rail and water, applicable to the Maryland field and its competing field also indicated some unfavorable conditions operating against Maryland.

Influences: Because of the fact that labor costs represent such a high percentage of production costs in the Maryland field (approximating 65%), influences affecting wages and hours assume great significance. Consequently, for the same reasons that were given in the Industry study of Maryland clothing, "Political influences" and "Industrial influences" assume predominant significance.

Kinds of Markets: Maryland coal moves to both "kinds" of markets - the "Industry market" and the "Ultimate consumer market."

Competitive Products: These of course have been clearly defined in the fuels group and are covered at considerable length in the general Industry study.(4)

Bibliographic References - The Coal Industry

(1) Coal, T & I.

(2) Coal, T & I., Exhibit A-29.

(3) Coal, T & I., Exhibit A-26.

(4) Coal, T & I.

THE RAYON INDUSTRY

(A Local Study of Rayon) (1)

Reason for Study: The general study of rayon indicated the rapid increase in demand for rayon yarns produced by the cellulose-acetate process. In 1928, 6.2% of the rayon production was by this process, while in 1935, 21.8% of the rayon production was by the acetate process. The rayon study indicated that the Celanese Corporation was the leading producer in this field with their plant located at Cumberland, Maryland.

The Indications of the Study

The Predominant Product: Rayon yanrs produced by the cellulose-acetate process.

Plant Locations: These were defined in the study(2). At the time of the report, the Cumberland plant was the only plant of the Celanese Corporation, producing rayon.

Secular Characteristics: The rapid increase of production of the acetate yarns has been indicated above. This was reflected clearly in indexes of employment in Cumberland's rayon plant (which we classify under "Textiles") by the following trends of employment in rayons and synthetic products, obtained from the Maryland Labor Bureau:

1929	100
1933	193.3
1934	220.1
1935	294.6

Cyclical Characteristics: The cyclical characteristics, considering employment, are indicated by the tabulation immediately above. The cyclical characteristics of production have also been clearly indicated and may be

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(1) All bibliographic references are explained at the end of this summary.

summarized here by saying that the cyclical characteristics of Cumberland textiles, because of its production of cellulose acetate yarns show exceedingly high positive departures in the '29-'37 cycle.

Causes Contributing: The causes contributing to the excellent secular and cyclical characteristics of this product - acetate rayon - may be defined as in part due to the technology which is responsible for the continued price reduction and quality improvement of these yarns, and in part due to the successful corporate policies of the Celanese Corporation which controls this operation.

Influences: The "Technical influence" is the one of most outstandind importance. The corporate influence assumes great importance, particularly as to what the company's policy will be in regard to a continued concentration of operations at Cumberland or installing additional capacity in other localities.

Kind of Markets: These are quite well known and their relative changes in demand are extremely dynamic as indicated by several of the preceding comments in this summary.

Bibliographic References - The Textile Industry

(1) Rayon - T.

(2) Rayon - T.

THE PORT OF BALTIMORE

(A General Study)(1)

Reason for Study: The reason for giving particular consideration to the Port of Baltimore as an Industry study was that the other Industry studies of Maryland clearly indicated the great importance of the Port to the economic status of the State, the economic status of the Baltimore Industrial Area, and to a number of the predominant Industries of this area.

The Indications of the Study

The Predominant Products: The general study indicated a very striking phenomenon regarding the exports and the imports of the Baltimore port, which was that over 70% of the exports and the imports of the Port on a tonnage basis were confined to an extremely small number of "products." The predominant imports and exports of Baltimore in that year, arranged in the order of their importance, are as follows:

Imports: Iron Ore and Manganese
Petroleum Products
Sugar and Molasses

Exports: Iron and Steel Products
Coal and Coke
Fertilizer

Secular Characteristics: The general study showed that fourteen ports of the nation handled over 70% of the total exports and imports. In the year 1935, Baltimore ranked fourth, the ports of larger tonnage being New York, Los Angeles, and Philadelphia. The Port has for years maintained its high status in the predominant ports of the country, and consequently has excellent "secular Characteristics."

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(1) Shipping, W.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Cyclical Characteristics: Generally speaking, the cyclical characteristics of our foreign trade, particularly as to recession lows, has been extremely bad. The departures of the Port of Baltimore, both "recession lows" and "recovery departures" have not yet been estimated, although the data are now available. Based on the relative tonnage figures of the different ports for the year 1935, it is anticipated that the Port of Baltimore will show positive departures in the '29-'37 cycle. Attention is directed to the fact that every one of the products appearing as predominant exports or predominant imports of the Port are either predominant products of Maryland's Industries or important raw materials of Maryland's Industries, and with one exception - coal and coke - they constitute predominant products or predominant raw materials of Industries residing in Baltimore's Industrial Area. This is mentioned here because it indicates with considerable definiteness the importance of the Port to the local Industries, as well as the converse - the importance of the Industries to the Port.

It is also mentioned because the relatively high stability of production, both secular and cyclical, of two of Baltimore's largest and most important Industries - Blast Furnaces and Steel Rolling Mills and Fertilizer - will tend to stabilize the secular and cyclical characteristics of the Port, since in each case most of the raw materials for these two Industries pass through the Port. It will be recalled that iron ore and manganese was the largest import passing through the Port in 1935.

Before preceding with any further "Industry studies" of Maryland's Predominant Industries or Extra-Sectional Service, the immediate procedure will be to complete the determination of the predominant products of all of Maryland's Predominant Industries, and the determination of the principal types of services rendered by her Extra-Sectional Services.

CHAPTER 8

A BRIEF CHRONOLOGIC REVIEW OF THE CHANGING INDUSTRIAL STABILITY OF MARYLAND INDUSTRY WITH THE COINCIDENT CHANGES IN INDUSTRIAL PATTERN

If, using the methods we have described, one studies first, the changing Industrial Pattern of Maryland, and second, the changing stability of Maryland Industry from 1860-1939, it becomes evident that this eighty year period is divisible into three time periods characterized by widely different levels of Industrial Stability.

From 1860-1880 Maryland Industry, considered collectively, showed a marked loss of stability; or in other words, in this period Maryland suffered a material loss of importance in the field of Interstate Commerce.

The period from 1880-1900 showed no appreciable gain or loss of Industrial stability. She neither gained nor lost Industrial importance in the nation. She had apparently stabilized at the lower levels to which she had dropped in the 1860-1880 time period.

But in the third period, 1900-1939, Industrial Maryland showed a marked gain in stability in the first decade of the period (1900-1910) and very consistently maintained this gain throughout the entire 39 year period.

As we further examine the widely different stability of these three time periods, it becomes evident that the gains of the third period more than compensated for the losses of the first period with the net result that Maryland's Industrial importance today is materially greater than it was in the years immediately preceding the Civil War period.

It is not difficult to define and synchronize the Industrial transition of this eighty year period with this sequence of losses and gains of Industrial stability. Throughout the first of the stability periods (1860-1880) and the second of these periods (1880-1900) there was little change in the Industrial characteristics of the State. As in pre-Civil-War

days, Industrial activities in the State were largely confined to the "Services" of which the Extra-Sectional Services were of predominant importance. In the, at that time, less important group of Productive Industries, coal maintained a position of importance in the western counties of the State; and fisheries, more particularly oystering, continued to be of importance to the Eastern Shore (the decline of Maryland oystering began in the late eighties while the "break" in Maryland coal production did not occur until 1923).

At the beginning of the third period (1900-1939), however, occurred an Industrial transition of extreme significance, for in the first decade of this period began the outstanding growth of importance of Manufacturing in the State.(1)

The major or more important changes in the State's economic pattern from the beginning of this period (1900) to the date of our Base Pattern (1930) are indicated by the occupational changes as shown in the following tabulations:

Gainfully Occupied:	1900	1930
Percent in Agriculture	20.8	12.5
Percent in Industry	79.2	84.2 *
Gainfully Occupied in Industry:		
Percent in Service Industries	63.5	58.6
Percent in Non-Service Industries	36.5	41.4
Percent in Extra-Sectional Services(1)	38.5(a)	(3) 25.6
Percent in Non-Service Industries (2)	36.5	(1) 41.4
Percent in Intra-Sectional Services(3)	25.0(a)	(2) 33.3

The first important transition is indicated by the two items showing the increase in relative occupational importance of Industry and the decline in relative importance of Agriculture for the 1900-1930 period.

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(1) Undoubtedly the Baltimore fire of 1904 provided an initial impetus to this growth. This has been discussed at some length in chapter 3.

(*) 3.3 percent were in unspecified occupations in the 1930 census.

(a) Estimated.

The second important Industrial transition is indicated by the figures showing the increase in relative occupational importance of the Productive or Non-Service Industries and the corresponding decline in relative importance of the Service Industries collectively.

The changing relative occupational importance of the Extra-Sectional, Non-Service and Intra-Sectional Service Industries is indicated by the remaining figures.

The reader will understand that in the period 1900-1930 and in fact the whole period 1900-1939 - the statement that the Non-service Industries increased in importance and the Services declined in importance in no way implies an actual numerical decline in the Service Industry group. As a matter of fact, both groups were increasing numerically during the period, but the Non-service or Productive Industry group was increasing more rapidly than the Service group as indicated in the following tabulation:

Gainfully Occupied:	1900	1930	% Increase
In Service Industries	230308	331608	44.0
In Non-Service Industries	133197	234768	76.0

The fact, however, that the Non-service group did increase in relative occupational importance has a peculiar significance to the increasing Industrial stability of the State in the 1900-1939 period. This is developed in the ensuing paragraphs under the caption of "repercussions."

Repercussions:

In this connection it is important to recognize the significance of the transition of Maryland Industry from "Servicing" to "Manufacturing" to the growth of what is now the most important of her Extra-Sectional Services, namely; Transportation. The significance is this; if Maryland's Industrial growth had been in the Services instead of in Manufacturing, the resultant growth in Transportation would have been far less than that which has actually occurred. The fact that Transportation did increase more

rapidly can be directly attributed to the transition in the State's Industrial characteristics from Servicing to Manufacturing.

In the first place, studies of Maryland Industry show clearly that the Manufacturing Industries of the State draw their raw materials almost entirely from sources without the State. It is also equally apparent that the great bulk of products fabricated in the State moves to markets which lie without the State.

As a consequence of these conditions the local transportation facilities are called upon to handle:

1. All incoming raw materials
2. All incoming indirect materials
3. All outgoing fabricated products

As contrasted with this, in the days prior to the transition (1860-1900) many of the products handled by the merchants, jobbers and agents of the State, never entered the State and therefore caused no demand on the local transportation facilities. Such products moved from consignors to consignees, who were both foreign to the State.

Besides this consideration other factors and materially greater ones have resulted from the transition and these in turn have occasioned a still greater impetus to the sustained growth of local transportation. They are discussed in the following paragraphs.

Because of losses involved in almost all manufacturing processes, the tonnage of raw materials used is always in excess of the tonnage of the finished products; in many cases very greatly in excess. Approximately 1.8 tons of iron ore are required to produce a ton of pig iron in blast furnaces. In the wet process of producing acid phosphate in the fertilizer Industry about 2 tons of raw materials (1 ton of phosphate rock and 1 ton of suphuric acid) are required to produce 1.8 tons of phosphate.

Because of the "Indirect materials" necessary, to a greater or less extent, in all processes, these impose a further demand on local transportation in addition to that occasioned by the principal raw materials and finished products. Under the head of "Indirect materials" are such materials as fuels, fluxes, certain chemicals and other materials, which through requisite to the process do not appear in the products. Limestone and other fluxes and coke are good examples of "Indirect materials." In the blast furnace charge these materials approximately equal the iron ore. An average mix being iron ore 50%, cincer 8%, limestone 14% and coke 28%. These Indirect materials appear to only a very limited extent in finished iron products. There is also a considerable shrinkage in weight in the production of coke from bituminous coals.

There is still another factor of large magnitude, peculiar to "manufacturing," which imposes a further demand on local Transportation. This is the item of maintenance and repair parts for plant equipment incidental to all manufacturing.

Because of its leading importance in Maryland's group of Extra-Sectional Service Industries, and "Industry Study" of Transportation is contemplated. Yet without such a study we can now state with definiteness that Maryland's rate of growth in local Transportation required by Manufacturing was greater than her growth in Manufacturing which has been indicated in considerable detail in this series of articles. Paradoxical as it may seem, the growth of local Transportation, requisite to Manufacturing, exceeded the growth in Manufacturing which occasioned it. This we can regard as the first and undoubtedly the most important repercussion on the Service Industries resulting from the transition in Maryland Industry from Servicing to Manufacturing.

This discussion may be reduced to a simple statement, namely; that a *manufacturing* community requires more transportation facilities for its local Industries than a Servicing community, and because of this, as the transition progressed, transportation facilities for local Industry grew with much greater rapidity than would have been the case if Maryland's Industrial growth had been the same but had continued in Trade.

This consideration of local transportation brings us rather naturally to a further consideration of the Port of Baltimore. In the first issue of this series we commented on the extreme importance of the Port to the economy of the State as well as to the City of Baltimore, and promised to develop this subject further in Part IV. We have commented in an earlier chapter on a condition of great significance to the Port of Baltimore which was that the Manufacturing Industries of Maryland as they expanded and grew in importance (1900-1939) with minor exceptions, secured their raw materials from without the State. This was true of the Manufacturing Industries of the Industrial Area of Baltimore. But another condition prevailed in the Industries of the Baltimore Area. To a very considerable extent, the sources of the raw materials of the manufacturers in this area were such as to favor marine transportation, and in many cases marine transportation of the raw materials was essential. This is clearly evidenced by the fact that in 1935, over 70% (on a tonnage basis) of the imports into the Port of Baltimore were raw materials for the Manufacturing Industries in the Baltimore Industrial Area.

Naturally the combination of a growth of Manufacturing in the Baltimore Industrial Area, and the large number of such manufactories depending on water transportation was reflected in the activities of the Port. As evidence of this in 1860, Baltimore's exports were $9,000,000(1)

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(1) "Rise of New York Port" by R.G. Albion, Scribners, pp. 390 and 391.

which represented 2¼% of the total value of exports in the United States, ranking Baltimore in eighth place in exports among the Ports of the country. Her imports amounted to $9,000,000 or 2½% of the nation's imports and she ranked fifth in imports.

In tonnage entering from foreign countries she (in 1860) ranked fifth. In the same year her tonnage cleared for foreign countries entitled her to a rank of seventh place among the nation's Ports. The total of tonnage entered and cleared in that year, through the Port of Baltimore represented 2.1% of the national tonnage entered and cleared (1).

In 1935 the Port of Baltimore ranked fourth in tonnage of combined exports and imports. (2)

The Second Industrial Survey of Baltimore, prepared and published by the Consolidated Gas and Electric Light and Power Company of Baltimore in May 1939, shows that the Port of Baltimore ranked second in 1937, in combined export and import tonnage. This survey also shows that Baltimore's portion of the total water-borne commerce of the nation reached a new peak in 1937 of 4.9%. Baltimore's percentage in 1919 and 1933 are shown to be 4.4% and 3.4% respectively. The tonnage through the Port is shown to have increased 113.6% from 1914 to 1937, while the value increased 162.8%.

These figures from various sources are not directly comparable for all purposes. When they are combined however, with our knowledge of the change in the character of products passing through the Port, as a result of the Industrial Transition in the Baltimore Area, and the great

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(1) "Rise of New York Port" by R.G. Albion, Scribners, pp. 392 and 393.
(2) J.M.S. Waring's report to Hon. Joseph Kennedy, chairman of the Maratime Commission, Sept. 1937.

increase in demand for these products in that area, they are sufficient to indicate:

1. That the transition has materially contributed to the growth of the Port.
2. That the Port's growth, due to this transition has far greatly exceeded that which would have resulted if the Baltimore Area's expansion had been of the same magnitude by in "Trade" rather than in "Manufacturing."

This growth of the Manufacturing Industries occasioned a third important repercussion in the services; this time in the group of Intra-Sectional Services. That is to say, it lent a very profound impetus to the local Power Industry in the Baltimore Industrial Area in that it occasioned a large resultant increase in the Industrial load of the local power operation, with resultant effects in low power costs and rates.

We have in the preceding chapters indicated the gain in secular stability of the Manufacturing Industries throughout this period, and the material we have just presented in the preceding paragraphs shows clearly that the gain in secular stability in the Manufacturing Industries occasioned coincident gains in stability in the most important of the Extra-Sectional Services - Transportation - in particularly the most important component of this - the Port of Baltimore - and in one of the largest factors in the Intra-Sectional Service group - local power production and distribution.

Sectional Stability:

We can now comment on another important condition or phenomenon peculiar to this 1900-1939 period. This relates to the fact that in this period all of Maryland's Industrial Sections, the three cities as well as the three rural Industrial Sections seemed to participate in the State's gain in secular stability. It is true that the Sections considered sep-

arately have had their individual characteristics of rises and falls during this forty year period, but each of them seems to approach the end of the period (current times) with definite indications of Industrial growth, better Industrial diversification, and better market diversification than obtained within those Sections at earlier periods in the century. In simple language, this clearly indicates the State's freedom from the burden of "distress areas" so common to a number of States. Such a reaction is obviously most favorable in relation to the stability of the State as a whole, but also to the stability of each of its Industrial communities (Sections) as well.

Cyclical Stability:

In the preceding chapters we have commented on the high cyclical stability of the Manufacturing Industries of Maryland collectively during the last two cycles of the time period (1900-1939) under consideration; that is to say, the '19-'29 and the '29-'37 cycles. But we have also clearly indicated in this chapter the dependency of certain Service groups on the Manufacturing Industries of the State. It follows, therefore, that the high cyclical stability of the Manufacturing Industries is reflected in high cyclical stability in the Services which react to this group of Productive Industries.

The reader will understand that while the Manufacturing Industries of the State considered collectively have consistently shown a gain in secular stability throughout the 1900-1939 period and that while as a consequence of this, certain of the Service Industries have shown coincident gains in secular stability for the same period, some of the Manufacturing Industries were losing stability and some were gaining, and in the Extra-Sectional Services the same condition obtained. As we see it, the important thing to recognize is that in both groups, namely the Pre-

dominant Industries and the Extra-Sectional Services, the gains in competitive position of several important Industries at all times outweighted the losses in competitive position of the remaining important Industries.

A more precise statement of the foregoing would be that at all times (within the 1900-1939 period) the gains in competitive position of several of Maryland's predominant products and several of the kinds of Service rendered by her Extra-Sectional Services have outweighted the losses of competitive position of the remaining important products and Services in the several competitive groups of products and Services.

In the light of very definite indications that Maryland has consistently gained in Industrial importance throughout the last forty years, and in the light of very definite indications that the conditions referred to in the last paragraph have prevailed throughout this period, it must follow that the influences(1) which determine the competitive position of Maryland's products and Services in their respective groups have, when considered collectively, reacted more favorably on Maryland's Industry than they have on the outlying Industrial Sections (again considered collectively) with which Maryland's Industries compete.

There are, of course, many individual instances in Maryland, as in all States, of influences of each kind which have been definitely prejudicial to the State's Industrial stability. But in the period of Maryland's Industrial expansion (1900-1939) we have found as yet no indications of prejudicial influences of such extent or continuance as to consider them of important significance to the welfare of the State or its communities. On the other hand, as we examine for this period trends of population, employment, wages and state revenues, and relate these trends to one another and to those of the nation or to other states, no pro-

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(1) As we have classified them, the Industrial, Corporate, Physical, Technical and Political Influences.

nounced discordances appear. As far as we have gone in the Industry studies, wherever a marked expansion of production has been observed, it has been accompanied by a reduction in "price per unit of quality." That is to say, we have found as yet no indications of outstanding producer-consumer-labor inequities. Nor have we yet found that legislative enactments within the State have in any general way imposed a burden on Industry that is prejudicial to its stability.

In concluding this chapter, we should like to say that although we have, in the 1900-1939 period, attributed the rate of growth in transportation, and particularly the rate of growth of the Port of Baltimore to the increase in importance of the Manufacturing Industries in the State, there is nothing anomalous in the statement that; the transportation facilities of the State made possible the increase in Manufacturing.

Maryland's Industrial concentration is and has been, for many years, in what we have called the Baltimore Industrial Area; and at the beginning of the long-time period (1860-1939) considered in this chapter, the transportation facilities in this area - land as well as water - were definitely the result of the Port Influence.

It is no flight of imagination to say that the development of the Port of Baltimore with the incidental development in land transportation in pre-Civil-War days made possible the later expansion in Productive Industry which is the outstanding characteristic of the 1900-1939 period. Thus, its part in advancing the Industrial importance of Maryland, another characteristic of the 1900-1939 period, has not, we believe, been over-emphasized in these studies.

Whatever may have happened to the "expendable resources of the State," to its timber, its oysters, its coal, this, one of its water re-

sources - the Port of Baltimore - has thus far been of enduring importance to the economy of the State. The bulk of its incoming shipments are raw materials for the Productive Industries of the Baltimore Industrial Area. In 1937 it ranked second in importance among the ports of the nation, a position it has never before attained.(1)

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(1) In 1860 it was sixth (in exports and imports).

CHAPTER 9

A SUPPLEMENTARY CHAPTER

THE TECHNICAL CORRELATIONS OF THE THREE PHASES OF THE SURVEY. STATISTICAL VALIDATIONS

In this Survey, the order of presentation has been as follows:

In Part II, the First Phase, which relates to the Base Pattern of the State, has been presented.

In Part III, the Second Phase, which relates to the Industrial changes in the Base Pattern, has been presented.

In Part IV, the Third Phase, which is diagnostic and relates to causal and effect determinations, has been presented.

In the development of these methods, the chronology of the development was quite different from this order of presentation. It was as follows:

1. The development of:

   The Industry studies.

   The 3 kinds of collateral studies;

      Corporate studies.
      Technical studies.
      Political studies.

2. The development of the statistical material as now presented in Part II.

3. The development of the statistical material as now presented in Part III.

The research on the four types of studies (item 1 above) was undertaken in 1920.

In 1924 the writer and his associates were retained on a problem of corporate reorganization. Their conclusions and recommendations in this case were founded on the four types of studies, and the methods used were for the first time substantially the same as those described in Part IV. Subsequent to 1924, these methods were adhered to, and while many refinements in detail have been adopted, there has been no essential change in the fundamental principles of the approach.

Recognizing that in this approach the "economic stability" of communities, of Industries, or of corporations were all predicated to depend on the "stability of demand" for the products (or types of service) of such communities, Industries or corporations, steps were then taken to classify the "productive Industries" and continuously determine and observe:

1st. The predominant products of the several Industry classifications.

2nd. The "competitive groups" of products.

3rd. The competitive position of the product components of such groups.

4th. The "predominant influences"(1) contributing to a change in competitive position of a product in its competitive group of products.

By 1928 this system was placed in operation, and subsequently utilized by the writer and his associates in problems relating principally to the development and marketing of new products, the development of new markets for existing products, and the evaluation of the stability of securities (bond and stocks).

In this Survey of Maryland the four types of studies have been presented as a part of the Third Phase which is defined as the diagnostic phase, in that it is directed to the determination of causes contributing

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(1) Political, Corporate, Industrial, Physical, or Technical.

to and effects resulting from observed change.

In no way does this imply that these four studies are solely for use in diagnosis. On the contrary, they contribute to all three phases of the approach used in this Survey. If this were not the case, they would not have been adaptable to the uses defined at the end of the preceding paragraph.

Since each Industry study, after defining the "predominant products" of such Industry, also, among other things, determines the geographic location of the principle producing areas for each of these products, the principal markets by kind (Industry or ultimate consumer markets) of the predominant products, and the kind and source of raw materials or semi-finished products entering into the production of the predominant products, it must be evident that the Industry studies collectively provide an Industrial Base Pattern for any desired year quite independent of the one presented in the First Phase and derived from the 1930 Census of Population.

Now, while this Industrial Pattern developed from the four types of studies provides a geographic pattern of a kind which we believe to be requisite to an economic study of the country and of the several states, it does not indicate the Industries on which the working population of a community depends, nor the degree or extent to which the communities are dependent on the several Industries constituting the Industrial grouping on which they collectively depend. It will be recognized that many of the workers resident in one community are employed in another community. Thus, a majority of those resident in Prince George's County, Md. whose occupations are Industrial are employed in the District of Columbia. The majority of the workers in "Blast Furnaces and Steel Rolling Mills" reside in Baltimore City; yet the only operations under this classification are in Baltimore County. Coal miners resident in Allegany County, Md. find employment in the same field, but over the West Virginia line. Recognizing the need of both types

of Industrial Patterns, the Sectional Pattern as presented in Part II, (the First Phase) of this Survey was undertaken in the summer of 1933 and completed in the summer of 1934.

Thus, in reality, the Industrial Pattern derived from the four types of studies becomes a part of the First Phase. Consequently, the two base patterns - that of the four types of studies, and that derived from census material as presented in Part II - are complementary and constitute the First Phase of the Maryland approach.

The purpose of the Second Phase, stated briefly, is to indicate changes in pattern, which are of dominant significance to the economy of the State and the communities within the State. Part III of this Survey presents certain statistical indicators of Industrial change, derived principally from the statistical material of the 1930 Census of Population, the Census of Manufactures, and the Bureau of Labor Statistics.

But the various statistical series presented in Part III are not the only indicators of pattern changes of dominant economic significance. The four types of studies presented in the Third Phase also provide indicators of such significant changes, and actually a great many more of these indicators of change than are presented in Part III of this Survey. A case in point is that of the six Industry studies described in outline in Part IV. They relate to Clothing, Steel, Fertilizer, Rayon, Coal and the Port of Baltimore. These studies were, in each case, prompted by an observation of a "change of economic significance." But in only one case, that of Clothing, was this change first observed in a statistical series such as one of those presented in Part III. In the other five studies the change was first observed in either an Industry(1), Corporate or Technical Study. Thus, the material relating to changes in Base Pattern as presented in Part III are in reality supplementary to those developed in Part

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(1) These Industry Studies were the "General" studies relating to Coal, Rayon, Iron, and Steel and the Port of Baltimore. It was these "General" studies, related to the national picture of these Industries as defined in Chapter 7, Part IV, which led to the "Particular" studies, of the same Industries, for the State of Maryland.

IV and which constitute an important part of the four types of studies presented under the Third Phase of this approach.

Because, therefore, the four studies, while presented under the Third Phase which relates to diagnostics, not only contribute to but are requisite to all three of the phases of the approach, they may be considered as fundamental to the approach. The Base Pattern presented in Part II may be considered as complementary to the pattern derived from the four studies and the changes in the pattern presented in Part III as supplementary to the pattern changes indicated by the four studies, while the four studies collectively provide the diagnostic methods of Part IV.

Statistical Validations:

In the opening chapter of Part III under the heading "The Use of Statistical Material" appearing on the fourth page of that chapter appeared the following:

> "In our use of statistical material in this Part III, therefore, no observation of a statistical change is accepted as evidence of such change. Wherever such a change is indicated by the statistical analysis, if it is a change of such magnitude as to indicate a gain or loss in competitive positive of an Industry, it is subjected to the diagnostics of the Third Phase of the Survey in which its validity is determined and its correctness established.

Now, the four types of studies - the Industry study and the three collateral studies (Technical, Corporate and Political) provide the basis for the diagnostic determinations as developed in Part IV.

A large part of the statistical material of Part III is from the Census of Manufactures and the Bureau of Labor Statistics. The primary reason for selecting the material of the Census of Manufactures was that it

provided, nationally and by states, trends of employment, wages, product value and value added by manufacture, for a considerable time period prior to our Base Pattern of 1930. The principal reason for utilizing the material of the Bureau of Labor Statistics was that it, too, provided us with trends of employment and wages, but in this case only for time periods subsequent to the date of our Base Pattern. In our Industrial analysis of Maryland, subsequent to 1930, we have used the B.L.S. data in preference to the other, principally because it was on a monthly basis, the material always being available within two months after its compilation.

This part of the chapter which is concerned with statistical validations is particularly directed to the Census of Manufactures material as presented in Part III. This material, as there presented, relates to the twelve Manufacturing Industries which constitute a part of the fifteen Predominant Industries of Maryland as defined by the Base Pattern of Part II.

The Census of Manufactures material is presented in Part III in the form indicated below. For simplicity, the following description will be confined to employment change and will serve to illustrate the methods of use of such material; and how the diagnostics of the Third Phase (the four studies presented in Part IV) are used in the process of validating such statistical material, when used in the special study of a State (such as the continuing economic Survey of Maryland).

1. Trend of employment in the entire manufacturing group (Exhibit 12, page 40, Part III).
2. The national trends of employment(1) in the twelve predominant Manufacturing Industries of the State (Exhibits 13 to 24, pages 42 to 65, Part III).
3. The local (State) trends of employment in the twelve Predominant Manufacturing Industries of the State (Exhibits same as in preceding paragraph).

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(1) Called "Industry Criteria."

The omission of two of these, namely, "Blast Furnaces and Steel Rolling Mills" and "Automobile Factories" will be noted(1) (Exhibit 16, page 48, Part III, and Exhibit 23, page 62, Part III).

4. The "Intra-State" Industry chart (Exhibit 9, page 25, Part III. This is derived from the several local trends described in item 3 above. Therefore, this "selected" group of Industries lacks the same two Industries omitted in item 3 above.)(1)

5. The "Inter-State" chart of Clothing.(2)

We have also prepared, but because of space limitations, have not presented in this survey, trends of the Predominant sub-classifications of the fifteen Predominant Manufacturing Industries of the nation which of course include the twelve Industries appearing in Maryland. A total of eighty-two sub-classifications for the fifteen Predominant Manufacturing Industries appears. These sub-classifications were selected by the following process.

The sub-classifications of each Industry Criterion were arranged in the order of magnitude of employment and those containing the largest employment, and which collectively represented 70% of the total employment in the Industry Criterion constituted what might be termed the Sub-criteria of the Industry Criterion.

Referring now to the local trends of the several Predominant Manufacturing Industries of Maryland (item 3 above) these were constructed in the following manner.

The local sub-classifications of each Predominant Industry were set up in the order of their magnitude of employment and in this case, too, those sub-classifications which collectively represented 70% of the total employment in the sub-classifications reported by the Census were selected as components of the local trend graphs. But it will be recalled that the Industry studies are also, among other things, directed to the determination of the sub-classifications reported by the Census were se-

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(1) Omitted by Census of Manufactures to avoid disclosures.

(2) Clothing has been used as an example. Similar charts for the remaining eleven Predominant Manufacturing Industries of Maryland will be prepared.

lected as components of the local trend graphs. But it will be recalled that the Industry Studies are also, among other things, directed to the determination of the sub-classifications of the Predominant Industries in the State, and in the various sections of the State. Consequently, when the sub-classifications of the local trends were established in the manner just described, reference was made to the Industry Studies to see if the sub-classifications as determined from the Census material omitted any of the local Industries. In such cases, omissions were noted. To illustrate, in the "chemical" Industry, our Industry Studies clearly showed two important omissions from the Census material. Consequently, it must be recognized that a number of the local trends presented in Part III have omissions of this kind. These, however, have been clearly defined in our original records.

This noting of the omissions of Predominant sub-classifications from the local trends presented in Part III constituted the first step in a validation process utilizing the diagnostics of Part IV. It is important to note here that the four types of studies not only point to any such omissions, but also indicate the order of magnitude of such omissions. This is an illustration of how the four types of studies of Part IV contribute to the validation of statistical material presented in Part III.

It may be noted here that the omissions if the kind just described are, in most cases, for the purposes of avoiding disclosures.

Thus far we have called attention to two types of "omissions" occurring in the Census of Manufactures material for Maryland:

1st. The omission of two of Maryland's Predominant Manufacturing Industries.

2nd. The omission of several "Predominant" sub-classifications which make up several local trends of employment presented in Part III.

Both the Base Pattern of Part II and the Industry Studies of Part IV directed attention to the omission of the two Industries, while the Industry Studies served also to point out the omissions of the Industry sub-classifications.

Thus, the Base Pattern of Part II and the diagnostics of Part IV both contributed to the validation of the Census of Manufactures material presented in Part III.

Now, being cognizant of these two kinds of omissions, we, in our diagnostic processes, proceeded in this way. We were considering the time period from 1929-1937, that is to say, we were considering the '29-'37 cycle. An examination of Exhibit 12, page 40, Part III, showed that employment in the Manufacturing Industries of Maryland considered collectively increased approximately 12% during the '29-'37 cycle. An examination, then, of the trend of the ten "selected" Industries from 1929-1937(1) showed that these ten "selected" Manufacturing Industries had declined 13.3% from 1929-1937. We, as described above, were aware of the omission of the two Industries previously noted, and proceeded to establish the magnitude and trends of employment in these two Industries derived from another source, namely, the Bureau of Labor Statistics. (For purposes of illustrating this approach, we have shown in Exhibit 16, page 48, Part III, the trend of local employment in "Blast furnaces and Steel Rolling Mills" related to the trend of national employment in that same Industry, both being derived from the B.L.S. series.)

It is quite possible, where the Intra-Sectional Chart of a State has Industry omissions, and where the several Industries have sub-classification omissions, to superimpose on a chart, first, the trends of the

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(1) See Intra-Sectional chart, Part III, Exhibit 9, page 25.

omitted Industries derived from other sources; second, the trends of the sub-classifications derived from other sources; and as these superimpositions were made, the trend of the "selected" Industries collectively more nearly approached the trend of the Manufacturing Industries of the State considered collectively.

It is of interest, however, to call attention to the fact that another superimposition was made by us on the Inter-State chart of Maryland. Our Industry Studies again showed us that two Industries - airplane manufacture which would fall under "Transportation Equipment" and which was not a Predominant Industry in the year of our Base Pattern, had since acquired predominance due to the growth of the Glenn Martin operation in Baltimore County; and it was also clear from the Industry Studies that rayon production in Cumberland, Md. has also acquired a position of Predominant significance since the date of our Base Pattern. These two trends and the magnitude of employment of each of these Industries were available from the Bureau of Labor Statistics series. After the various superimpositions, the corrected Intra-State chart agreed fairly well with the trend of Manufacturing Industries collectively.

Now, a procedure identical to that just described is possible in the case of omissions of the local Industry sub-classifications. But, first, we should like to digress in this paragraph from the subject of validations to make the statement that the local trends are never, in our diagnostic processes, directly related by us to the Industry Criteria as would be implied by an observation of the Exhibits in the Third Phase. First, we inject an intermediary step which is this. For each of the fifteen Predominant Manufacturing Industries of the nation are determined its Predominant sub-classifications on a national basis. Thus, the clothing Industry, considered nationally is broken down into several sub-classifi-

cations such as men's clothing, haberdashery, women's wear, etc. These national sub-classifications are established on the Predominant basis similar to the methods described in determining sub-classifications in the local Industries.

Consequently, in our diagnostic processes when we have established the fact that the Predominant local sub-classification of Maryland's Predominant Industry, clothing, is men's clothing, we, in our analysis, then relate the local trend of men's clothing to the national trend of men's clothing; and then, as a secondary step, relate the national trend of men's clothing to the national trend of the clothing Industry which, it may be stated here, includes all classifications of the national clothing Industry.

One important reason for this procedure may be described as follows:

The reader will recall that in Part II was presented a map showing the national distribution of clothing. This distribution, as we have stated previously in the Survey, defined the areas potentially competitive to Maryland's clothing Industry, and showed that there were thirty-two states potentially competitive to the Maryland clothing Industry. But our Industry studies, as well as an examination of the Census data showed that the sub-classification "Men's Clothing" appears in only nine of these thirty-two sections. These nine states are now regarded as the states which are actually competitive with Maryland's clothing Industry; and in our Industry study of clothing, the trend of men's clothing is first related to the national trend of men's clothing and then, as described above, this national trend of men's clothing is related to the national trend of the clothing Industry, thus bringing in the intermediate step.

After the digression of the last paragraph, we revert to the subject of validation. As a matter of fact, while we have spoken of the last paragraph as a digression, it, too, has a very definite bearing on

the validity of our statistics, particularly in view of the fact that it points out the sub-classification and, therefore, the statistical material relating to the sub-classification which is of the most direct interest in our diagnostic processes.

It is fully recognized that even after "corrections for omissions" of both kinds have been considered in the manner described, many questions relating to statistical validations remain. Thus, our "corrected" sub-classification only includes those sub-classifications which our studies have indicated to be predominant in that particular Industry group. Thus, it is not a complete sample of the Industry group.

Next, it is perfectly obvious that the sub-classifications of the Census which we use are not necessarily representative of the sub-classification of the Industry, and they very definitely are inadequate to define or show in any way the "Sectional" distribution of those samples. As the reader will recognize, this knowledge of the "Sectional" distribution of these sub-classifications is essential to the process we are using.

Recently, the Department of Commerce has published a book entitled "Industrial Market Data Handbook" which shows by counties the distribution of the plants of the various Industrial sub-classifications. To illustrate, this publication shows Fertilizer (one of the sub-classifications of our Chemical Industry) to occur in Baltimore City and in eight counties of the State. Our Industry study of fertilizer shows the Predominant Production of fertilizer to be in Baltimore City, and therefore our attention concentrates on the thirteen samples shown by the handbook to appear in Baltimore City, and our next problem in validation is to ascertain whether these thirteen samples adequately portray the changes in the fertilizer Industry as we define it. Now, incidentally, our Base Pattern has shown that all of the counties in which the county fertilizer plants are shown to appear in the handbook are in Agricultural Sections,

and our Base Pattern has already indicated that Industry is of minor importance in such Sections, obviously indicating, therefore, that a component of Industry there is of extremely little significance. Now, the thirteen plants shown by the Census to appear in Baltimore may be an adequate sampling for representing fertilizer considered collectively in Baltimore, and also in the State, but they are definitely inadequate for our purposes of diagnostics for the following reasons:

The reader has seen that our Industry studies concentrate on a study of the products of the Industry. The two predominant types of product in the fertilizer Industry may be classified as: Superphosphates and mixed fertilizer. Our Industry studies show and define which of the Baltimore Fertilizer plants are complete, semi-complete or mixing plants. It is necessary, for our purposes, to break down the sample and define which of the thirteen plants in Baltimore are representative samples of each classification.

> A complete plant is a plant operating its own acid plant and its own acidulating plant for acidulating the rock with the sulphuric acid to produce the superphosphate. It also produces mixed fertilizer.
>
> A semi-complete plant has the acidulating plant, but does not manufacture its own acid. It also produces mixed fertilizer.
>
> A mixing plant has neither an acid plant nor an acidulating plant and is purely engaged in the mixing process.

It will by this time, we presume, be apparent to the reader that an analysis of the fertilizer Industry in Maryland along these lines is a very definite step in the process of vailidating the statistical material of the Census of Manufactures to determine whether the sampling is repre-

sentative of the Industry in the State, as well as of the Industry in the Sections where it is known to have predominant significance.

There is no question that there still remains considerable statistical material taken from the Census of Manufactures and presented in Part III which requires validation, even after consideration of the various "omissions" referred to in this chapter, and even after consideration of plant locations and types of plants as described in the preceding paragraph. It will probably be recognized, however, that if this process of diagnostics were being pursued in all of the states of the country, that it would constitute in effect a very definite validation of all the national statistical data presented in Part III.

We have been attempting in our research to develop a rational method of continuing diagnostics, and we have not considered it within our province to attempt to validate, on a national basis, the type of statistical material which we have presented and which we are, for the moment, accepting at its face value. However, careful records have been kept of all of the statistical data which we have presented and which we are using and complete classifications of it are available so that, as we see it, it is readily susceptible to any further refinements directed to improvement in statistical accuracy.

We should like to end this last chapter with this statement - that even if there were available and published complete statistical data of all of the Industries, of all of the sub-classifications, and in addition to these, complete statistical data of all of the products of these Industries, it would still be necessary if we were to continually observe changes and the changing inter-relationships of these "parts" of the economic structure to resort to the utilization of a symbolism and to consider the predominant parts and the predominant influences acting on them.